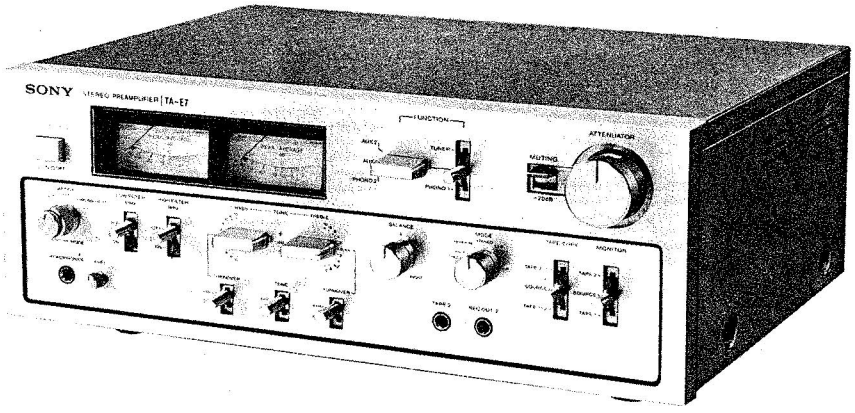
TA-E7/E7B

TA-E7 (Panel: Silver)
AEP Model
UK Model

TA-E7B (Panel: Black)
US Model
Canadian Model
AEP Model
UK Model



TA-E7 (AEP, UK Model)

STEREO PREAMPLIFIER

SPECIFICATIONS

GENERAL

Power Requirements: 110, 120, 220,or 240 V ac adjustable, 50/60 Hz (AEP, UK model)
120V ac
60 Hz (US, Canadian model)

Power Consumption: 22 W

Dimensions: (AEP, UK model)
Approx. 430 (w) x 170 (h) x 320 (d) mm
16⅞ (w) x 6¾ (h) x 12⅝ (d) inches
Including projecting parts and controls
(US, Canadian model)
Apporx. 460 (w) x 170 (h) x 320 (d) mm
18⅛ (w) x 6¾ (h) x 12⅝ (d) inches
Including projecting parts and controls

Weight: (AEP, UK model)
Approx. 11.2 kg, 24 lb 11 oz (net)
Approx. 13.4 kg, 29 lb 9 oz
(with shipping carton)
(US, Canadian model)
Approx. 12 kg, 26 lb 80 oz
Approx. 14.4 kg, 31 lb 130 oz
(with shipping carton)

Continued on page 2 –

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND ⚠ MARK ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ !

LES COMPOSANTS IDENTIFIÉS PAR UN TRAMÉ ET UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DES SUPPLÉMENTS PUBLIÉS PAR SONY.

SONY®

SERVICE MANUAL

AMPLIFIER SECTION

Inputs:

	Sensitivity	Impedance	Maximum Input Capability (0.03% distortion, 1 kHz)	S/N (weighting network, input level)
PHONO 1	2.5 mV (−50 dB)	50 kΩ	250 mV (−10 dB)	85 dB (A, 2.5 mV)
PHONO 2		50 kΩ/100 kΩ		
HEAD AMP	0.125 mV (−76 dB)	25 Ω (at "3 Ω") 100 Ω (at "40 Ω")	12.5 mV (−36 dB)	75 dB (A, 0.125 mV)
TUNER AUX 1, 2 TAPE 1, 2	150 mV (−15.5 dB)	50 kΩ	—	105 dB (A, 150 mV)

Outputs: **0 dB = 0.775 V**

	Output Level	Impedance
REC OUT 1, 2	150 mV (max. 15 V) (−15.5 dB)	1 kΩ
OUTPUT 1, 2	1.5 V (max. 10 V) (5.5 dB)	1.5 kΩ
HEADPHONE	10 mW (8 Ω)	3.3 Ω

Harmonic Distortion: Less than 0.003% at 1.5 V output

IM Distortion: (60 Hz: 7 kHz=4:1) Less than 0.003% at 1.5 V output

Frequency Response: PHONO 1, 2 RIAA equalization curve ±0.2 dB
TUNER, AUX 1, 2, TAPE 1, 2 } 1 Hz–150 kHz $^{+0}_{-1}$ dB

Tone Controls:
BASS ±10 dB at 30 Hz (TURNOVER FREQ 150 Hz)
±10 dB at 60 Hz (TURNOVER FREQ 300 Hz)
TREBLE ±10 dB at 20 kHz (TURNOVER FREQ 4 kHz)
±10 dB at 40 kHz (TURNOVER FREQ 8 kHz)

Filters: LOW: 12 dB/oct. below 30 Hz
HIGH: 12 dB/oct. above 9 kHz

Residual Noise: Less than 6 μV (A-Network, IHF)

LEVEL METER SECTION

Frequency Response: 20 Hz – 70 kHz $^{+0}_{-3}$ dB

Response Time: 300 msec. in AVERAGE mode
1 msec. in PEAK mode

Response Range: −40 dB to +10 dB (METER SENS control at CAL position)
−60 dB to −10 dB (METER SENS (0 dB = 1 Vrms)

Indication Error: −10 dB to +10 dB ±0.5 dB
−30 dB to −10 dB ±1.5 dB

MODEL IDENTIFICATION

SPECIFICATION LABEL

TA-E7B (US, Canadian Model)

SONY®
STEREO AMPLIFIER
MODEL NO. TA-E7B
AC 120 V 60Hz 22 W
SERIAL NO.
MADE IN JAPAN

TA-E7B (AEP, UK Model)

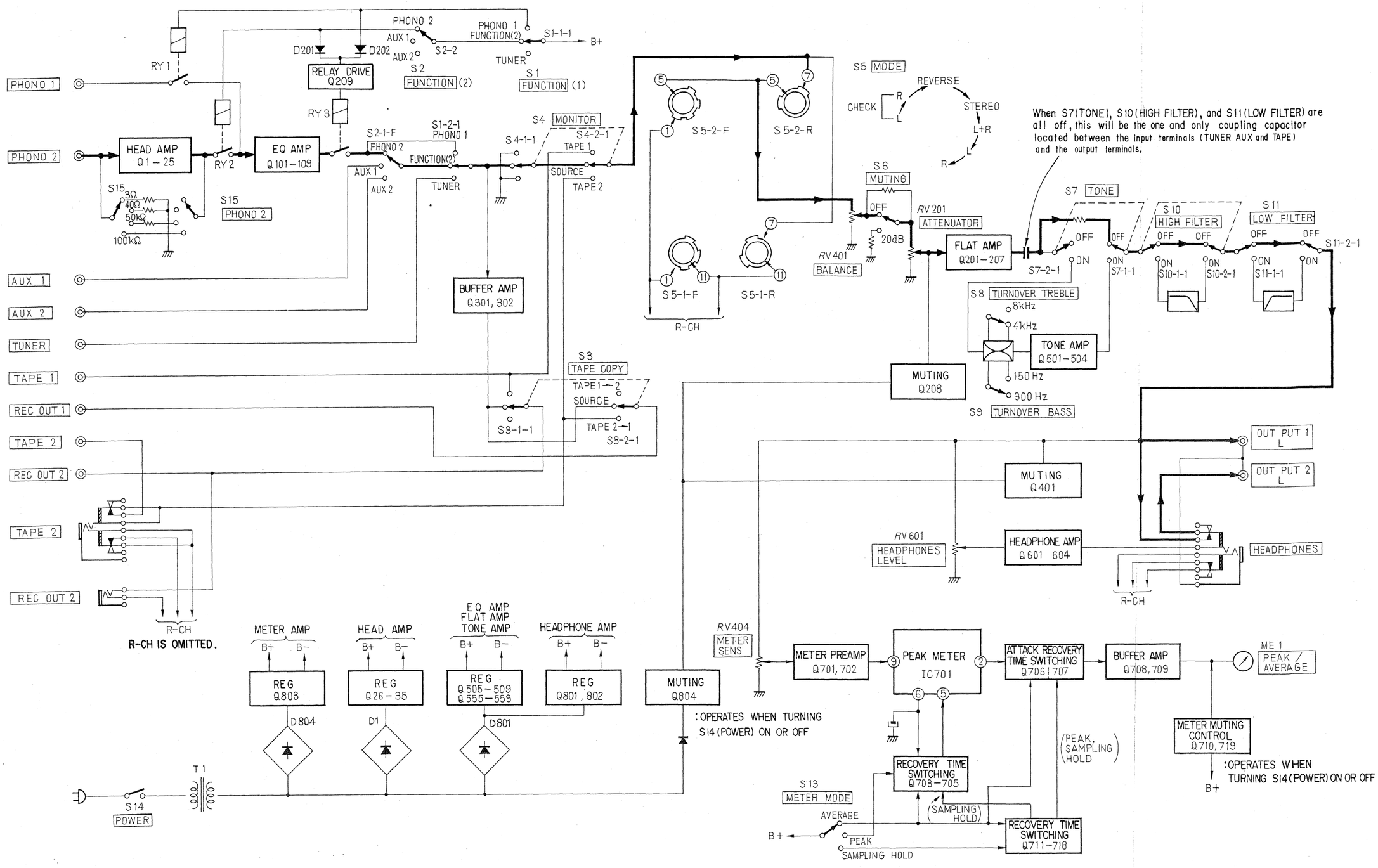
SONY®
STEREO AMPLIFIER
MODEL NO. TA-E7B
AC 110 120 220 240V ~ 50/60Hz 22 W
SERIAL NO.
MADE IN JAPAN

TA-E7 (AEP, UK Model)

SONY®
STEREO AMPLIFIER
MODEL NO. TA-E7
AC 110 120 220 240V ~ 50/60Hz 22 W
SERIAL NO.
MADE IN JAPAN

SECTION 1
BLOCK DIAGRAM

1-1. BLOCK DIAGRAM



1-2. CIRCUIT DESCRIPTIONS

Meter Mode Switch (S13) Set to AVERAGE Position

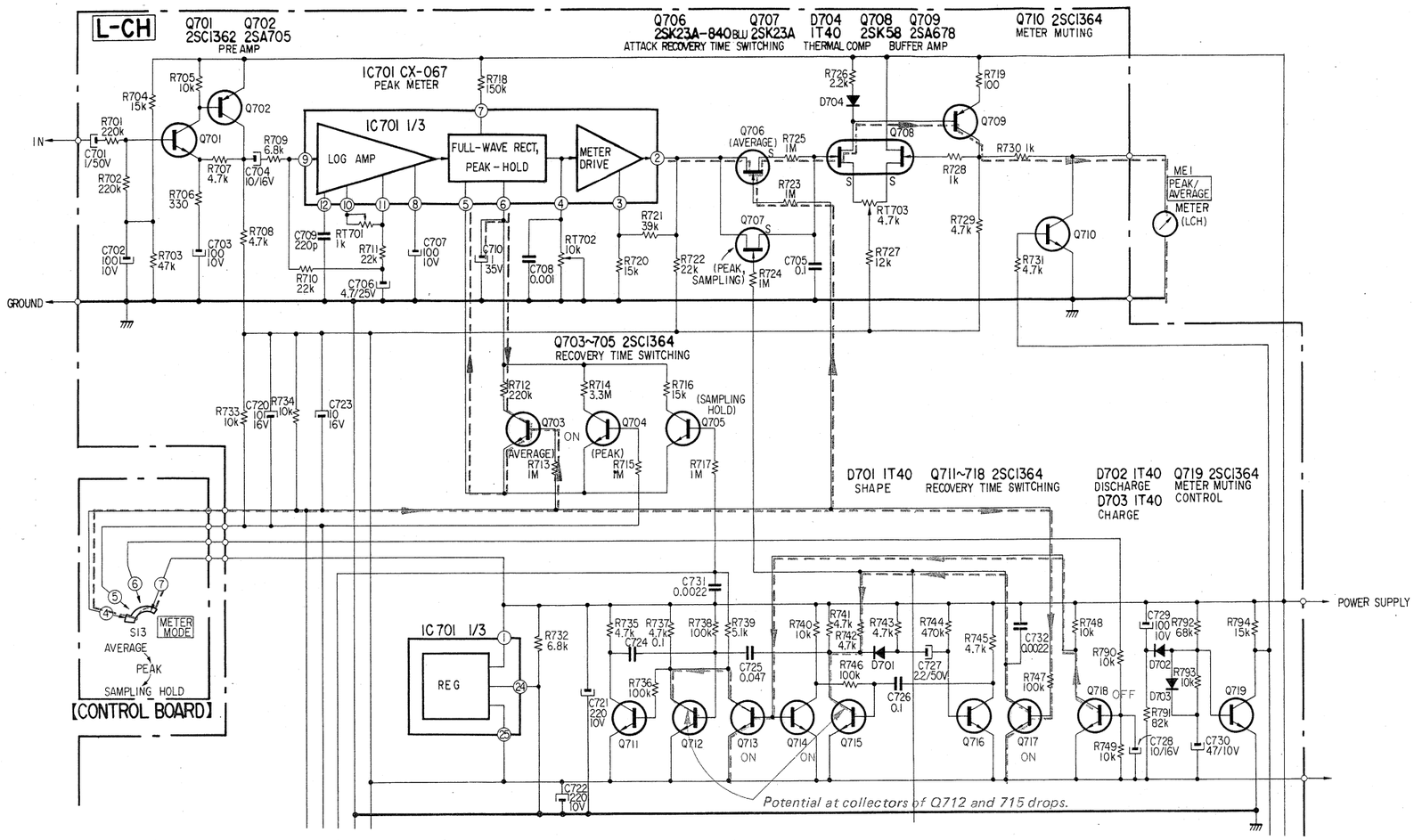


Fig. 1

PEAK METER CIRCUIT

The TA-E7/E7B features large-sized peak level meters which provide accurate checking of output levels. There are three different meter display modes, selected by the METER MODE switch (AVERAGE, PEAK, and SAMPLING HOLD).

1. Preamplifier Circuit (Fig. 1)

The tone amplifier output is passed via the RV404 METER SENS control and amplified by the preamplifier (Q701, Q702) of the meter circuit. The minimum value of this METER SENS control is 0 dB-turning up to maximum value will increase meter sensitivity by approximately 20 dB. For example, when the meter reads 0 dB, the output level is approximately −20 dB.

In other words, the Q701, Q702 preamplifier provides a control margin of 20 dB.

Furthermore, this amplifier also includes a limiter 4 V in order to prevent excessive meter deflection.

The preamplifier output is applied to the terminal 9 of IC701, the major circuit component of the meter circuit.

2. IC701 (CX-067) and It's Surrounding Circuits (Fig. 1)

CX-067 is designed to perform Log conversion, full-wave rectification, peak holding, and other functions for two separate channels. It also incorporates a pair of power supply circuits in order to provide voltages required for internal operation of the IC (powered by a single external power supply).

The following description refers to the left channel.

(1)Log Conversion Circuit

Input signals are converted to logarithmic form by means of the non-linearity of the diode inserted in the NFB circuit of the OP amplifier. The meter scale is thus compressed, permitting output levels to be checked over a wide range. The logarithmic function may be varied by changing the amount of NFB through the diode (i.e. changing the resistance of RT701 inserted across the terminals 10 and 11 of the IC.

(2)Full-Wave Rectifier Circuit

Full-wave rectification is necessary in order to detect both the ⊕ and ⊖ peaks of the input signal. In the CX-067, the ⊕ side is half-wave-rectified, amplified two times in amplitude, and then mixed with the original (inverted) signal, thereby attaining full-wave rectification. The meter can thus be made to deflect in proportion to the peak levels in the input signal.

However, if this full-wave-rectified signal is applied directly, the meter needle can not respond to the pulse-like signal. For this reason, the CX-067 also includes a hold circuit where peak level signals charge up a capacitor, thereby permitting the meter to respond accurately to the peak levels.

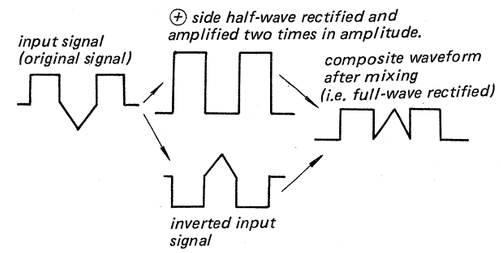


Fig. 2

(3)Hold Circuit and Attack Circuits

The three selectable meter modes are:

a) Average ..... ordinary response time, the same as ordinary VU meters.

b) Peak ..... extremely rapid response time, capable of responding to pulse-like signals. (minimum detectable pulse width 1 ms).

c) Sampling hold .. maximum peak level detected every 0.5 sec (approx.) and held for about 0.5 sec.

The hold and attack circuits are employed for easy reading the meter values.

1) Hold circuit

The capacitor C710 connected to terminal 6 of IC701 is charged up by the full-wave-rectified signal.

The charging amplifier is also used as the full-wave rectification circuit. Due to the voltage on C710, an NFB is applied to this full-wave rectification circuit, thereby determining meter hold time.

This hold time is determined by the discharge time of C710. For peak and average meter modes, the respective discharge resistors R712 and R714 are switched over by the transistor switches Q703 and Q704.

* During peak mode, Q704 is turned on (see Fig. 4), and C710 discharges through R714 (3.3 MΩ) taking approximately five times longer than during average mode (see Fig. 3).
* During average mode, Q703 is turned on (see Fig. 1), and C710 discharges relatively rapidly through R712 (220 kΩ) (see Fig. 3).
* During sampling hold mode, Q705 turns on every 0.5 seconds, and C710 discharges immediately through R716 (15 kΩ) (see Fig. 5).

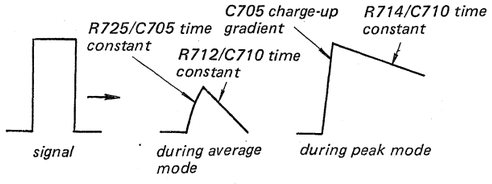


Fig. 3

Meter Mode Switch (S13) Set to PEAK Position

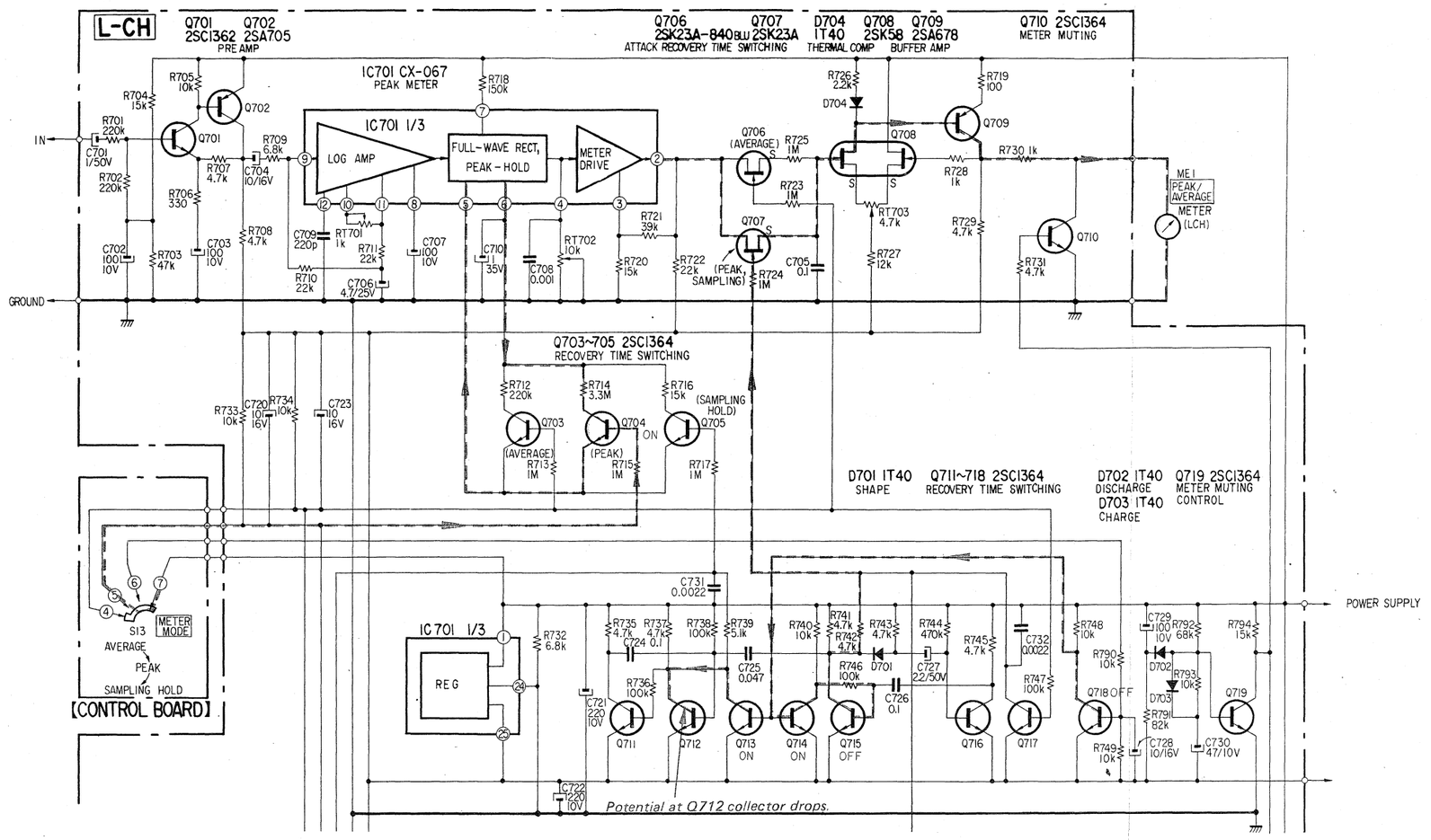


Fig. 4

2) Attack circuit

This circuit makes it possible to use ordinary level meters as peak level meters since the meter is overdrived (kicked) by the input signal and the differential value of the input signal.

The output signal from the hold circuit is gain-adjusted (RT702) by the drive amplifier, passed through FET switch Q706 or Q707, and applied to capacitor C705.

* During average mode, Q706 is turned on (Fig. 1) and current passed through R725, charges C705. Charge-up time is thus determined by the C705/R725 time constant. (Fig. 3).
* During peak mode, Q707 is turned on (Fig. 4), but since there is no resistor connected in series, C705 will charge up immediately (Fig. 3).
* During sampling hold mode, Q707 is turned on (Fig. 5) resulting in the same rapid charge-up time as during peak mode.

Meter Mode Switch (S13) Set to SAMPLING HOLD Position

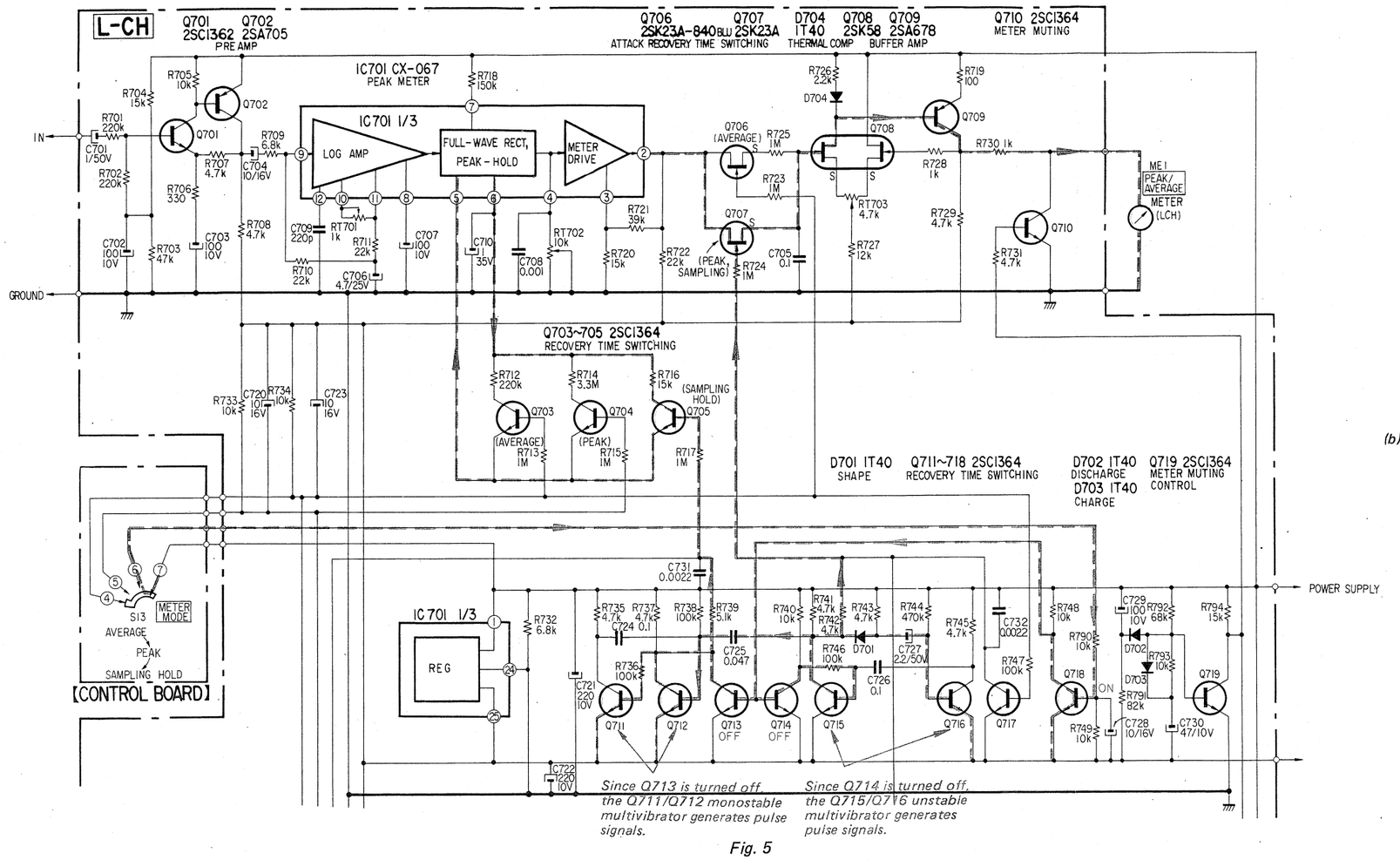


Fig. 5

3. Circuit Operation and Meter Display During Sampling Hold Mode (See Figs. 5 & 6)

Q705 is turned on at t_0. C710 discharges rapidly through R716. Since Q705 turns off at t_1, C710 starts to be charged up according to the input signal, and resulting in an increase of C710 terminal voltage. This terminal voltage is held at the value corresponding to the maximum peak level of the input signal between t_1 and t_3 (shown by mark *). Since the Q707 FET switch is turned on at t_2, C705 is rapidly charged, and then Q707 turns off at t_3, the C710 terminal voltage level is, therefore, maintained at the maximum peak voltage level (also shown by mark *), this being indicated by the meter until t_5.

At the same time as Q707 is turned off (t_3), Q705 is turned on again, this cycle being repeated continuously. So actually, the maximum peak value in the 0.5 sec period from t_1 to t_3 (or more correctly to t_2) is indicated by the meter during the 0.5 sec period from t_2 to t_5. If the maximum peak (shown by mark **) during the t_4 to t_6 period is even higher than the maximum peak during the previous 0.5 sec period (i.e. t_1 to t_3), C705 will be charged up further, resulting in an additional increase in the C705 terminal voltage. If, however, the following maximum peak is lower, C705 will discharge accordingly, resulting in a corresponding drop in terminal voltage, this being made possible by the bi-directional properties of the Q707 FET which permit reverse dischargeing.

In this sampling hold mode, the meters display the maximum peak level for every 0.5 sec, making it easier to follow the changes in peak level.

4. Meter Drive Circuit (Fig. 5)

Since the Q706 and Q707 FET switches are of high impedance, Q708 and Q709 are a buffer amplifier to drive the meter.

Q708 is a dual FET differential amplifier designed to stabilize the meter drive circuit.

5. Meter Muting Circuit (Fig. 5)

In order to prevent meter deflection caused by surge current when the power supply is turned on and off, a meter muting circuit, consisting of Q719 and Q710, is used. This surge current is used to activate Q719, which controls Q710, consequently Q710 turns on for duration of pulse caused by the surge current to mute the meter signal.

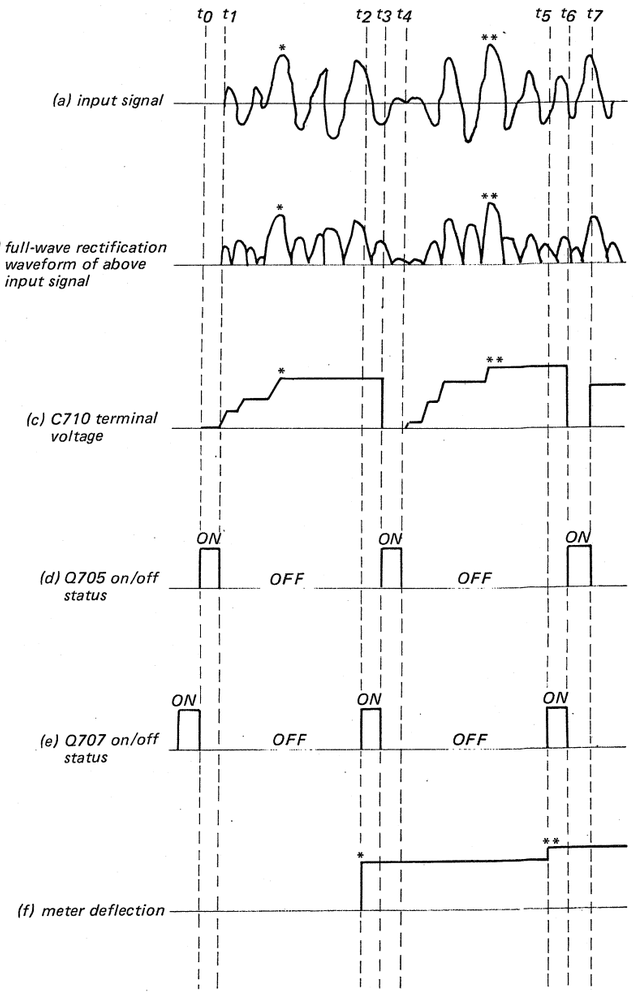
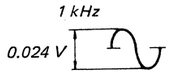


Fig. 6

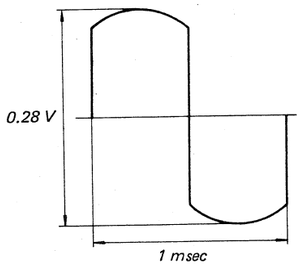
Signal Waveforms at Important Points of the Circuit

Ⓐ *waveform at input terminals*



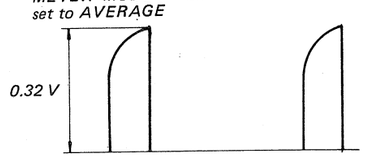
with 1 V output signal at the output terminals

Ⓑ *waveform at pin 11 of IC701*

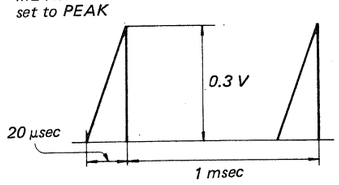


Ⓒ *waveform at pin 5 of IC701*

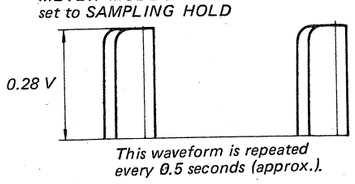
METER MODE switch set to AVERAGE



METER MODE siwtch set to PEAK



METER MODE switch set to SAMPLING HOLD



This waveform is repeated every 0.5 seconds (approx.).

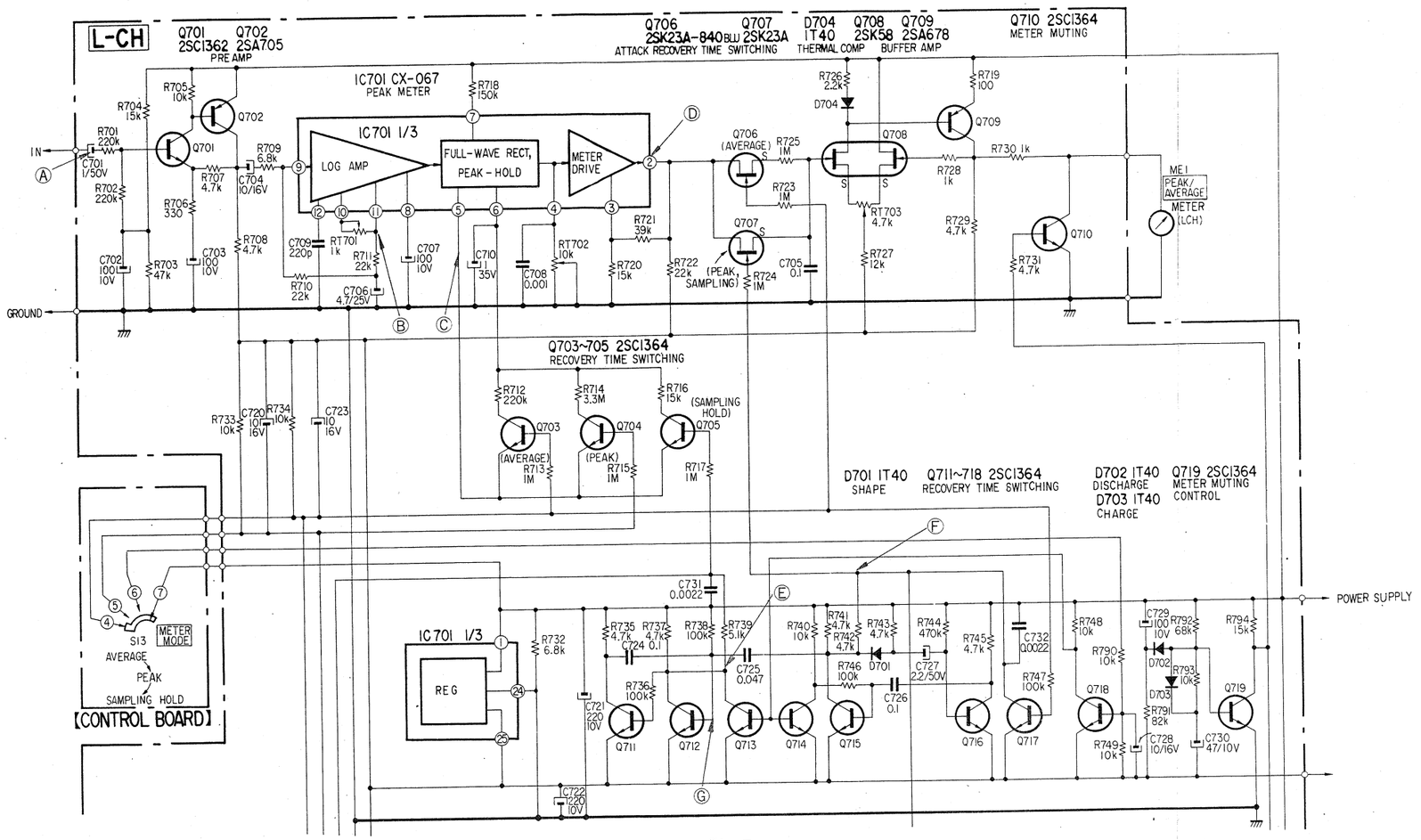
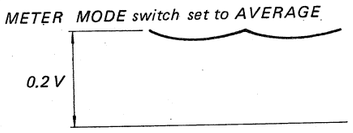


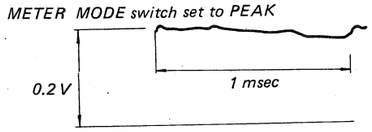
Fig. 7

Ⓓ *waveform at pin 2 of IC701*

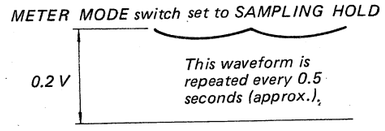
METER MODE switch set to AVERAGE



METER MODE switch set to PEAK

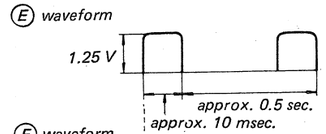


METER MODE switch set to SAMPLING HOLD

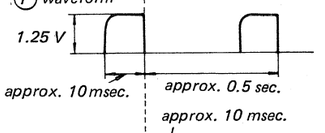


Waveforms for Ⓔ and Ⓕ refer to when the METER MODE switch is set to SAMPLING HOLD position.

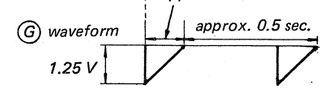
Ⓔ *waveform*



Ⓕ *waveform*



Ⓖ *waveform*



HEAD AMPLIFIER CIRCUIT

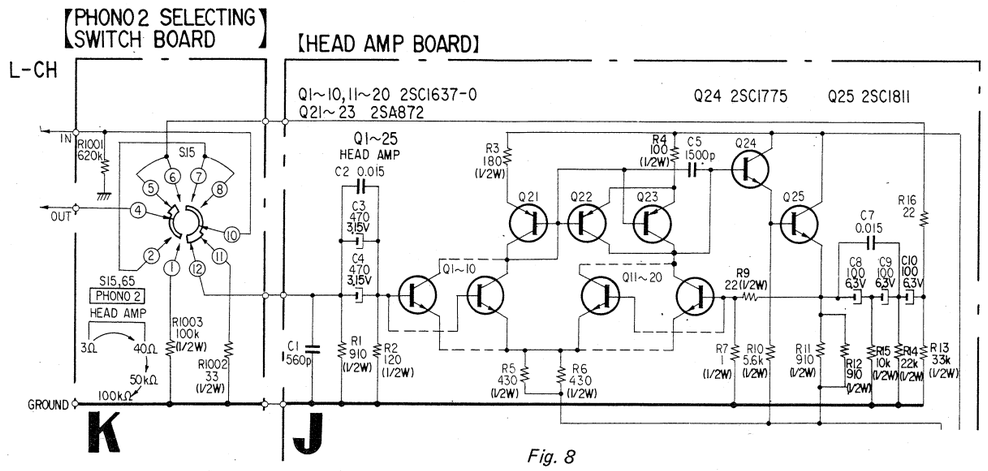


Fig. 8

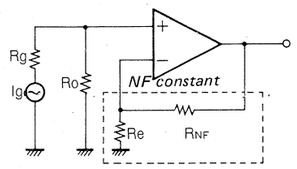
The TA-E7 is equipped with a head amplifier in order to handle the low internal impedance and low output level of moving-coil type cartridges. A high S/N ratio has been achieved by adopting (in the first stage) a current mirror differential amplifier consisting of parallel-connected low-noise LEC (low emitter concentration) transistors which reduce the equivalent noise resistance.

Furthermore, a 3 Ω/40 Ω impedance selector is used in order to cope with the various different moving-coil type cartridges available on the market. High output moving-coil type cartridges and moving-magnet type cartridges can also be employed.

The left channel head amplifier circuit is shown in Fig. 8. The impedance selector switch is set to the value matching to the impedance of the cartridge being used. The input signal from the PHONO-2 terminals is applied to the parallel-connected differential amplifier formed by Q1 to Q10.

The head amplifier equivalent circuit is shown in Fig. 9. The input impedance is kept high by feedback circuit, and a choice of different values for terminating-resistance Ro is available. Another important factor in designing a head amplifier of low equivalent input noise is the reduction of the number of amplifier stages. If most of the gain is obtained in the first stage, noise level will be determined by the first stage.

The open-loop gain of the first stage differential amplifier in the TA-E7 is 70 dB. The next stage is an impedance convertor with approximately 0 dB gain and the output signal is fed back to the first stage.



Rg = signal source resistance
Ig = signal source voltage

Fig. 9

The gain A of the actual amplifier shown in Fig. 9 is given as follows:

$$A \fallingdotseq \frac{R_{NF} + Re}{Re}$$

In the TA-E7, $A = \frac{R9 + R7}{R7} = 23$, or approximately 27 dB.

Since the output voltage produced by conventional cartridges includes both mechanical and electrical resonances, voltage amplification is required. Therefore, input impedance has to be at least greater than the cartridge impedance.

For this reason, the actual input impedance will be approximately 25 Ω when the impedance selector switch is set to the 3 Ω position, and approximately 100 Ω when set to the 40 Ω position.

Q21 to Q23 are a differential amplifier with current mirror circuit to increases the gain and form push-pull circuit for the load to improve distortion.

Low impedance is obtained at the head amplifier output stage (Q24, Q25) by means of a Darlington connection impedance conversion.

As was mentioned earlier, parallel-connected transistors are used to reduce the equivalent noise resistance. The reason for this reduction is briefly outlined below.

The effective noise level generated in a transistor is given by the follwing formula:

$$\sqrt{\overline{e_n}^2} = \sqrt{4KFT\left[r_{bb'} + \frac{r_e}{2} + \frac{(r_e + r_{bb'})^2}{2r_e h_{fe}}\right]} \quad \ldots(1)$$

where $\overline{e_n}^2$ = the effective noise level generated in the transistor,
K = Boltzmann's constant,
T = absolute temperature,
F = band width,
$r_{bb'}$ = base dispersion resistance,
r_e = effective emitter resistance $\frac{26}{Ie'}$
h_{fe} = current amplification ratio, and
Ie = emitter current

But if h_{fe} is large, and r_e and $r_{bb'}$ both small,

$$\sqrt{\overline{e_n}^2} = \sqrt{4KFT\,(r_{bb'} + \frac{r_e}{2})} \quad \ldots(2)$$

In other words, it is necessary to select transistors of low $r_{bb'}$ and high h_{fe}.

Series connections are often used in order to reduce the $(r_{bb'} + \frac{r_e}{2})$ factor.

In Fig. 10, two transistors are shown as connected in series. The $r_{bb'} + r_e$ factor in the equivalent circuit will become ½, so $(r_{bb'} + \frac{r_e}{2})$ will also become ½. Consequently, according to formula (2), noise will become $1/\sqrt{2}$, that is, a reduction of 3 dB. If n transistors are connected in series, noise will be reduced by $1/\sqrt{n}$.

Series Connection

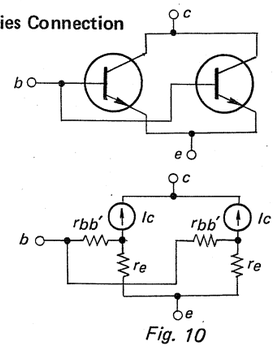


Fig. 10

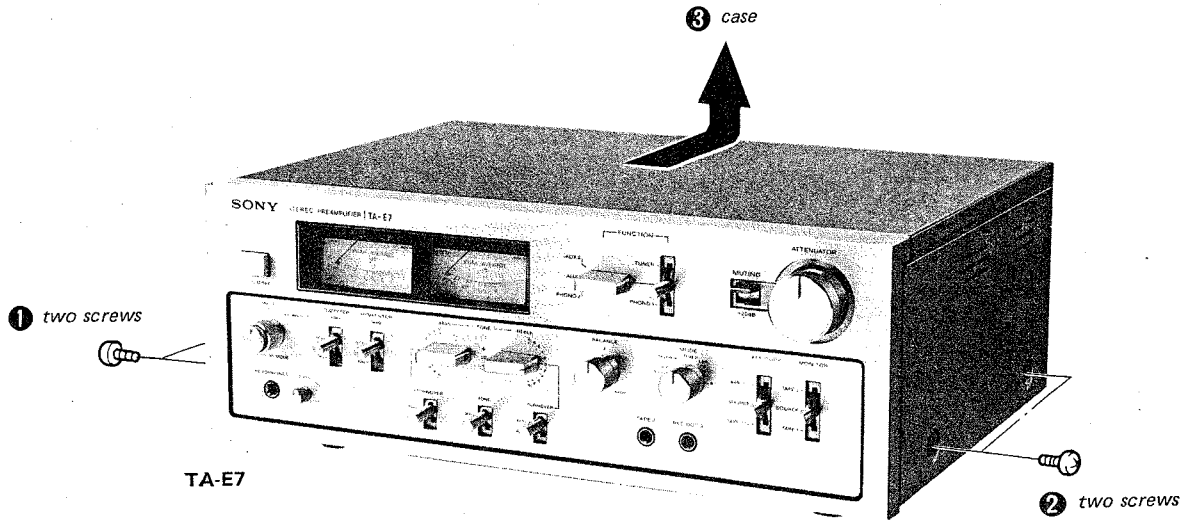
Muting Circuit

In order to prevent the generation of switching noises when the power supply is turned on and off, and also to prevent the appearance of any signals at the output until the whole amplifier circuitry has been completely stabilized after switching on (approximately 3 seconds), the TA-E7 uses a muting circuit. This circuit mutes the input of the flat amplifier and output of the preamplifier by checking the surge of current at Q804.

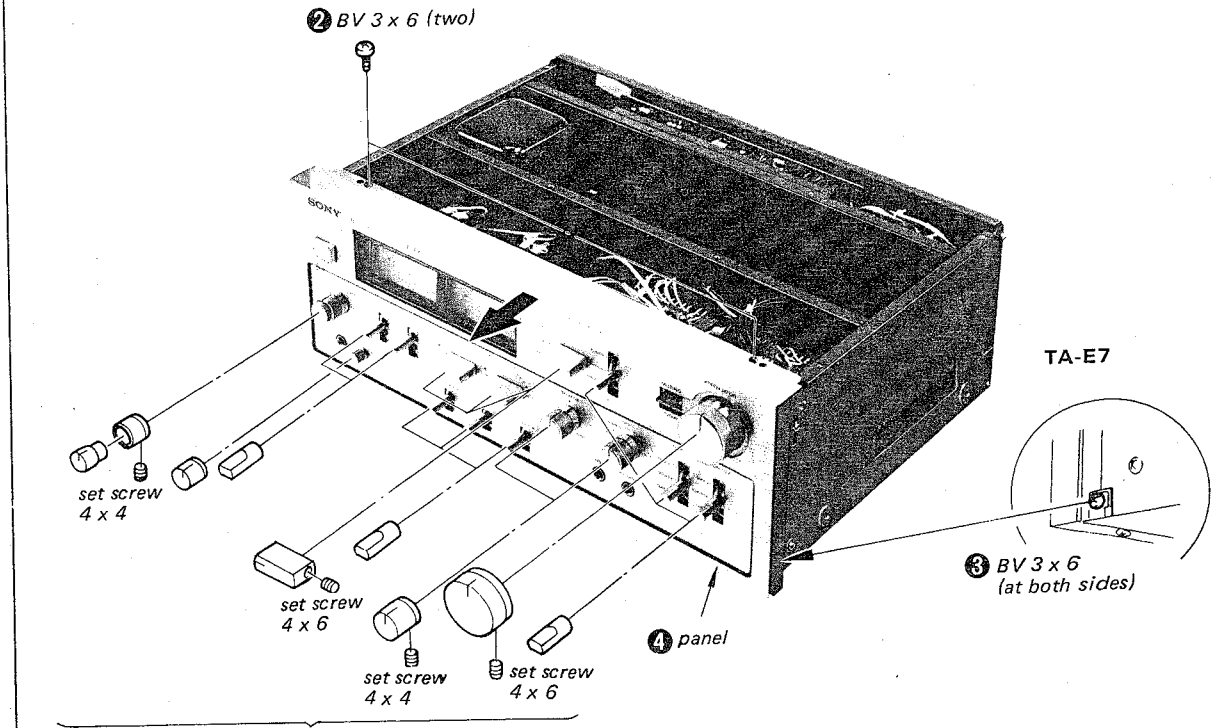
SECTION 2
DISASSEMBLY

Remove the parts in the numerical order.

CASE REMOVAL

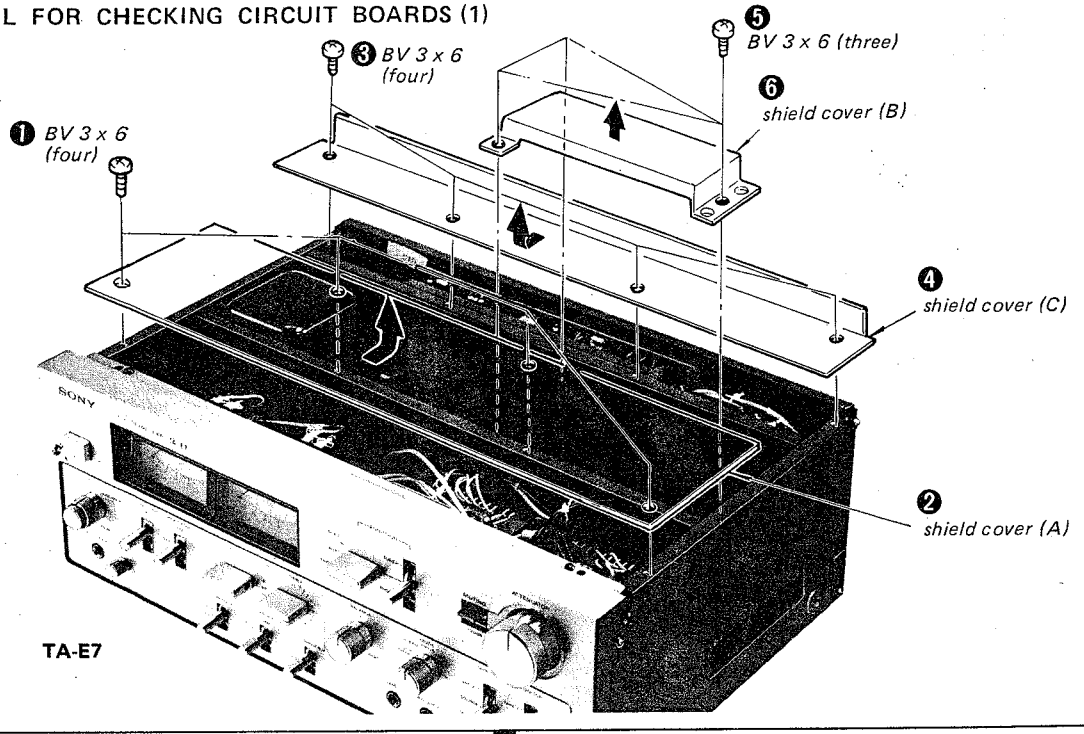


PANEL REMOVAL

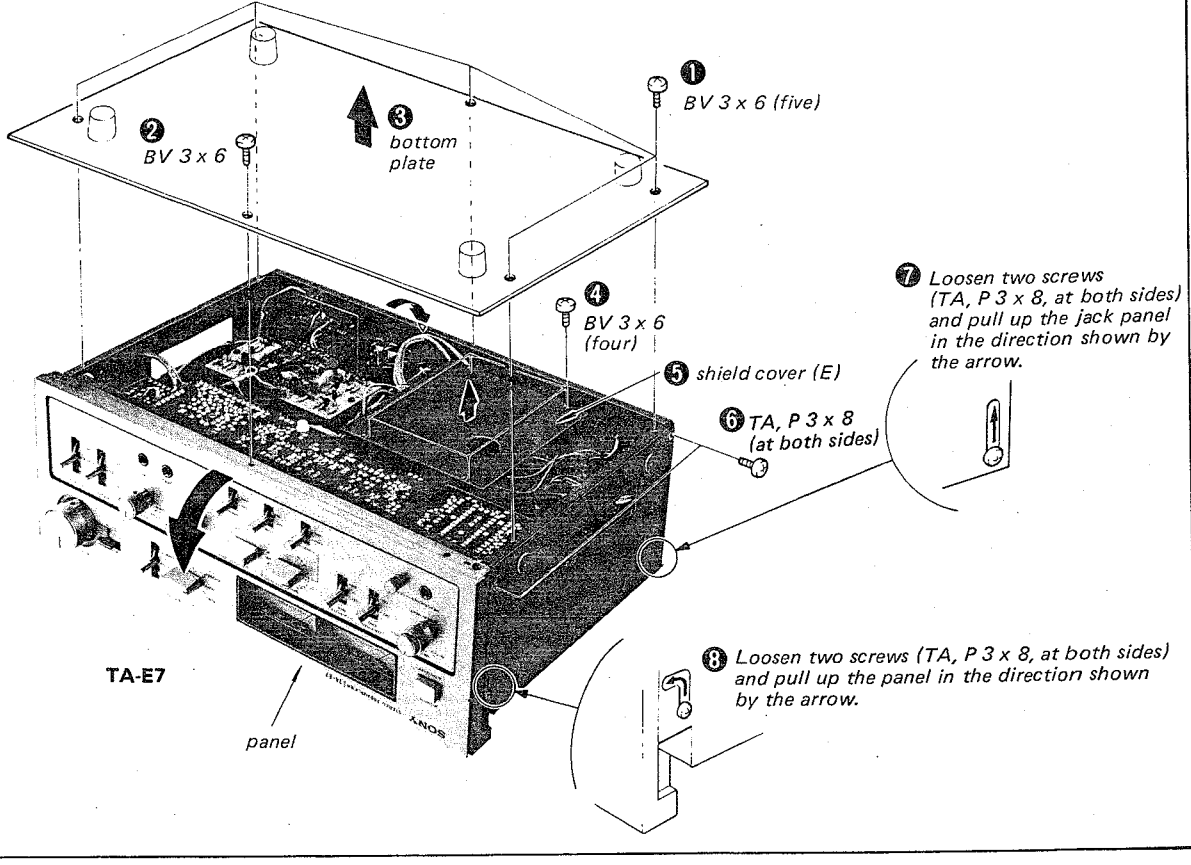


❶ Loosen the set screws and pull out all knobs.

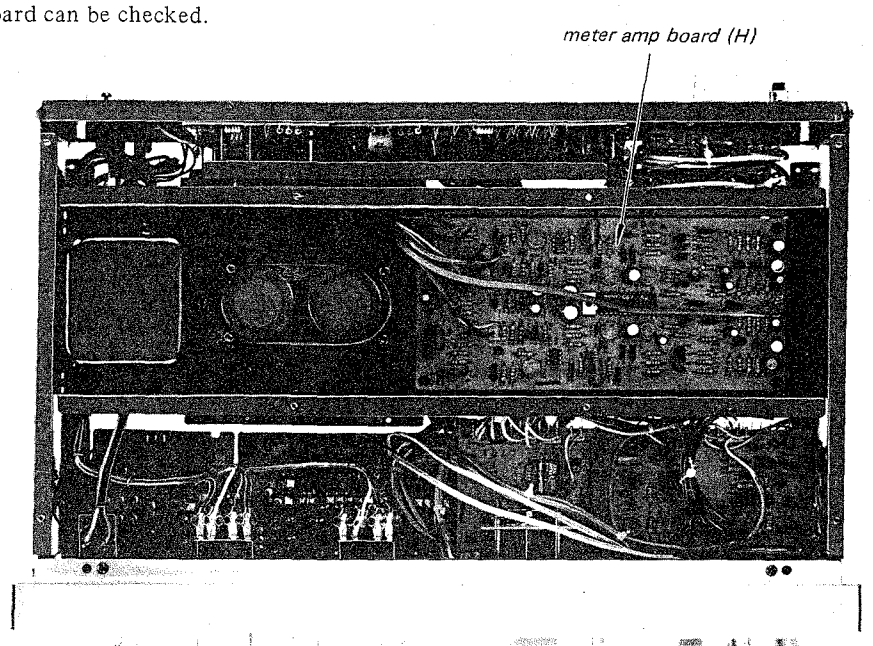
REMOVAL FOR CHECKING CIRCUIT BOARDS (1)



REMOVAL FOR CHECKING CIRCUIT BOARDS (2)

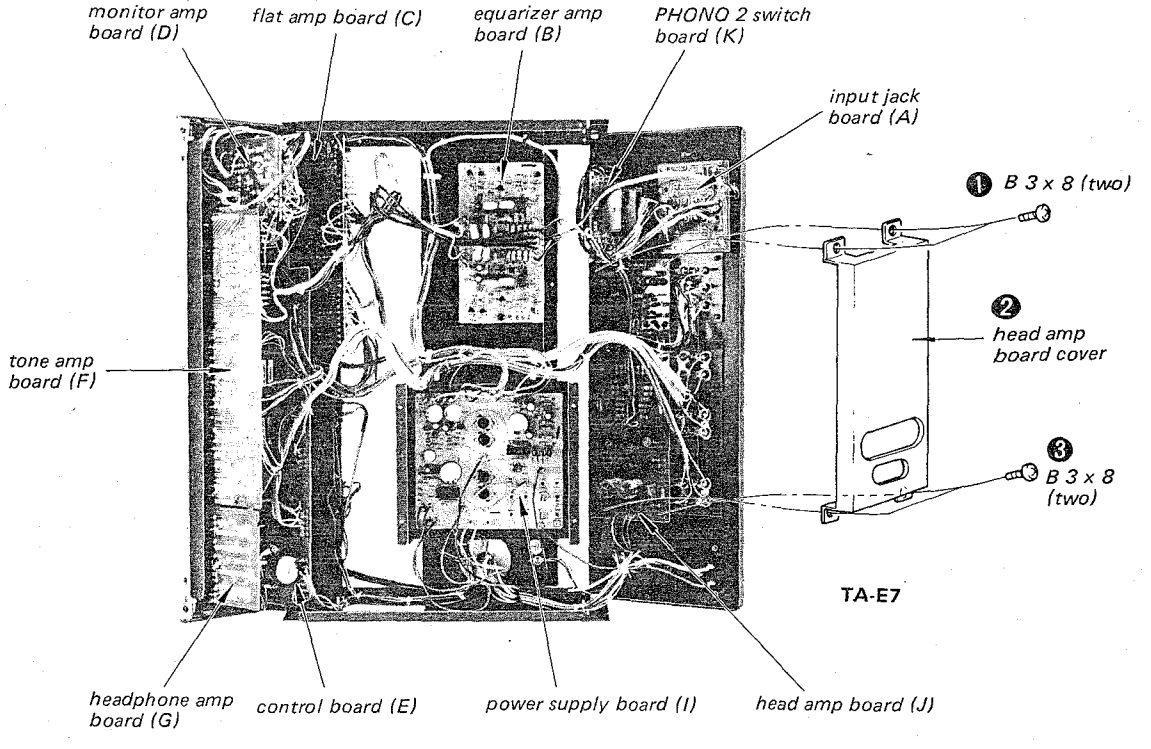


Meter amp board can be checked.



TA-E7

Circuit boards can be checked.



TA-E7

SECTION 3
ADJUSTMENTS

Control and Switch Setting:

Unless otherwise specified, set the controls and switches as follows.

FUNCTION switch:	TUNER
MODE switch:	STEREO
BALANCE control:	mechanical mid
TONE switch:	OFF
HIGH FILTER switch:	OFF
LOW FILTER switch:	OFF
METER MODE switch:	PEAK
METER SENS control:	MIN

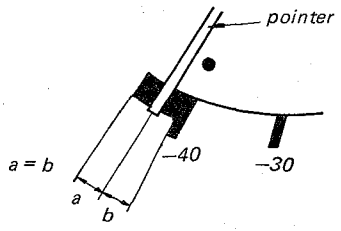
METER ZERO LEVEL ADJUSTMENT

Setting:

ATTENUATOR control: fully counterclockwise position (∞)

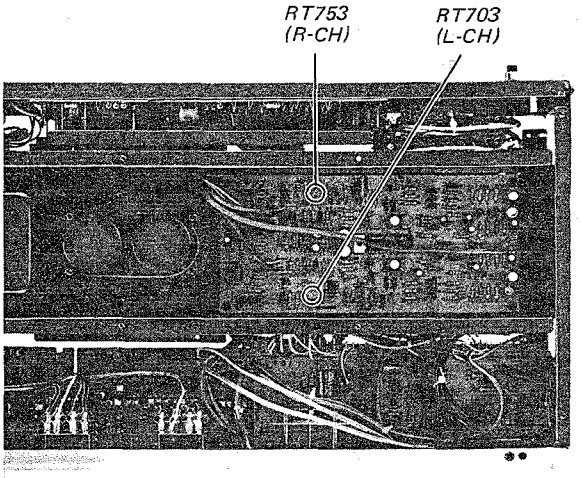
Procedure:

Adjust RT703 (L-CH) and RT753 (R-CH) for specified pointer position on the PEAK/AVERAGE meter as shown below.



Adjustment Location:

– Meter Amp Board –

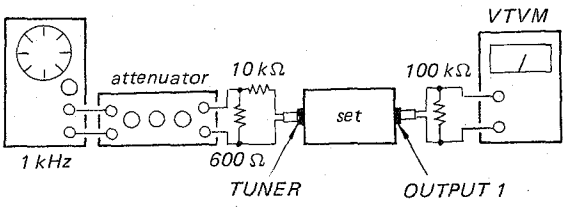


METER 0 dB, −10 dB ADJUSTMENT

Setting:

ATTENUATOR control: fully clockwise position (0)

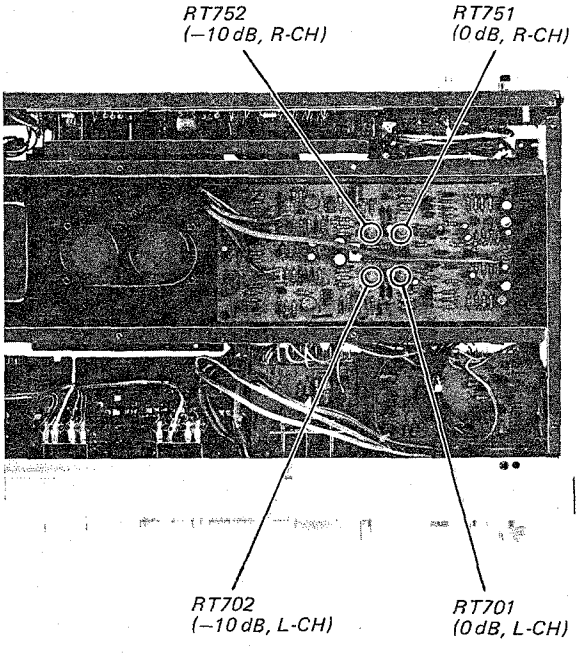
Procedure:



1. Adjust the attenuator for 1 V reading on VTVM.
2. Adjust RT701 (L-CH) and RT751 (R-CH) for 0 dB reading on the PEAK/AVERAGE meter.
3. Set the attenuator to 10 dB lowered position from the position obtained in step 1 above.
4. Adjust RT702 (L-CH) and RT752 (R-CH) for −10 dB reading on the PEAK/AVERAGE meter.
5. Repeat above steps several times.

Adjustment Location:

– Meter Amp Board –



SECTION 4
DIAGRAMS

CIRCUIT BOARDS

A: INPUT JACK BOARD
B: EQUALIZER AMP BOARD
C: FLAT AMP BOARD
D: MONITOR AMP BOARD
E: CONTROL BOARD
F: TONE AMP BOARD
G: HEADPHONE AMP BOARD
H: METER AMP BOARD
I: POWER SUPPLY BOARD
J: HEAD AMP BOARD
K: PHONO 2 SWITCH BOARD
MUTING SWITCH BOARD

4-1. SCHEMATIC DIAGRAM

J: HEAD AMP BOARD
K: PHONO 2 SWITCH BOARD

Note:

- Components for right channel have same values as for left channel.
- All capacitors are in μF unless otherwise noted. pF = μμF 50WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ½W.
  kΩ = 1000 Ω, MΩ = 1000 kΩ
- (N) : low-noise resistor.
- ——— : B+ bus.
- ▭ : panel designation.
- — — — : B− bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).
- Switch

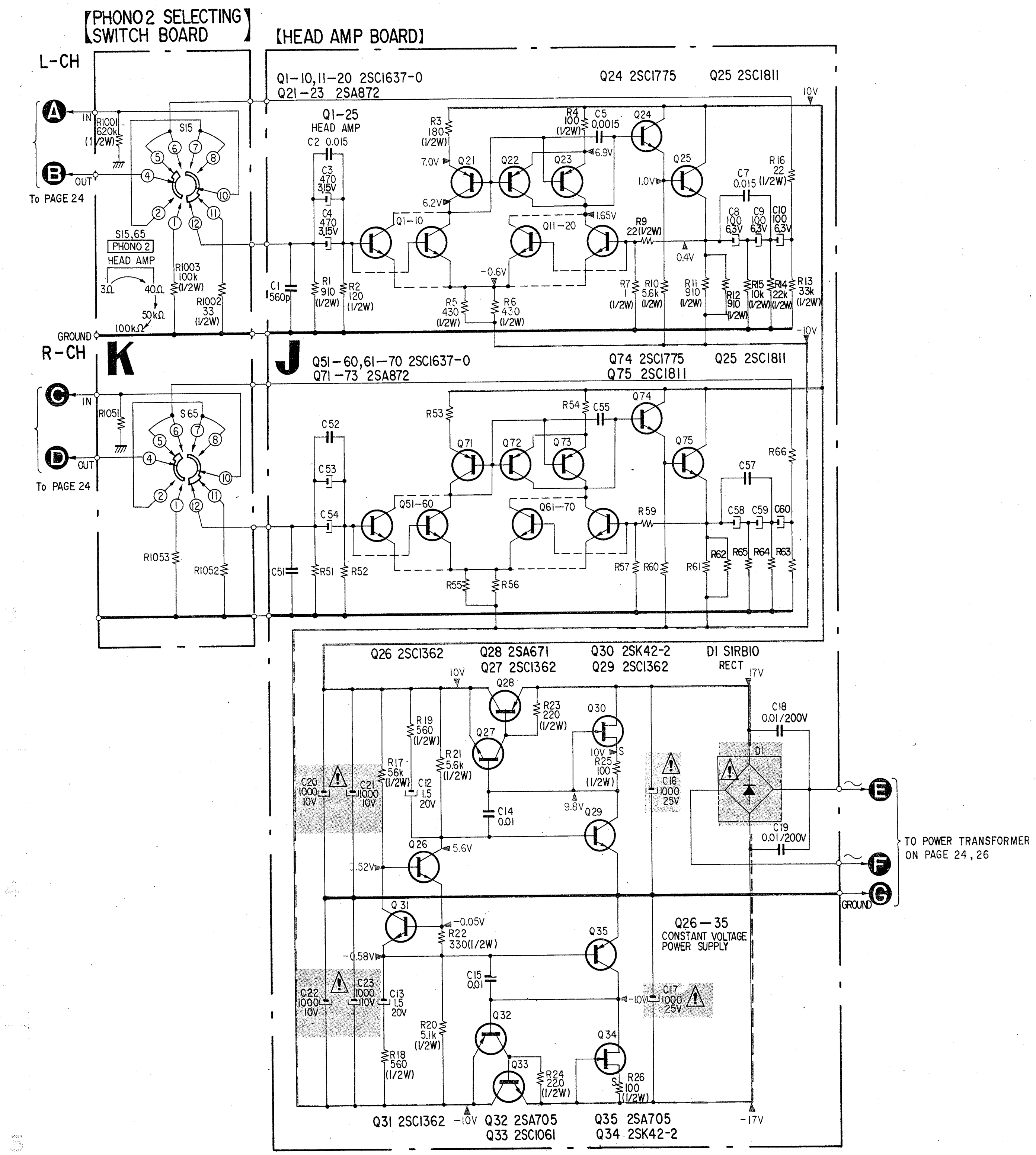
Ref. No.	Switch	Position
S15 S16	PHONO 2	HEAD AMP 3 Ω

Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

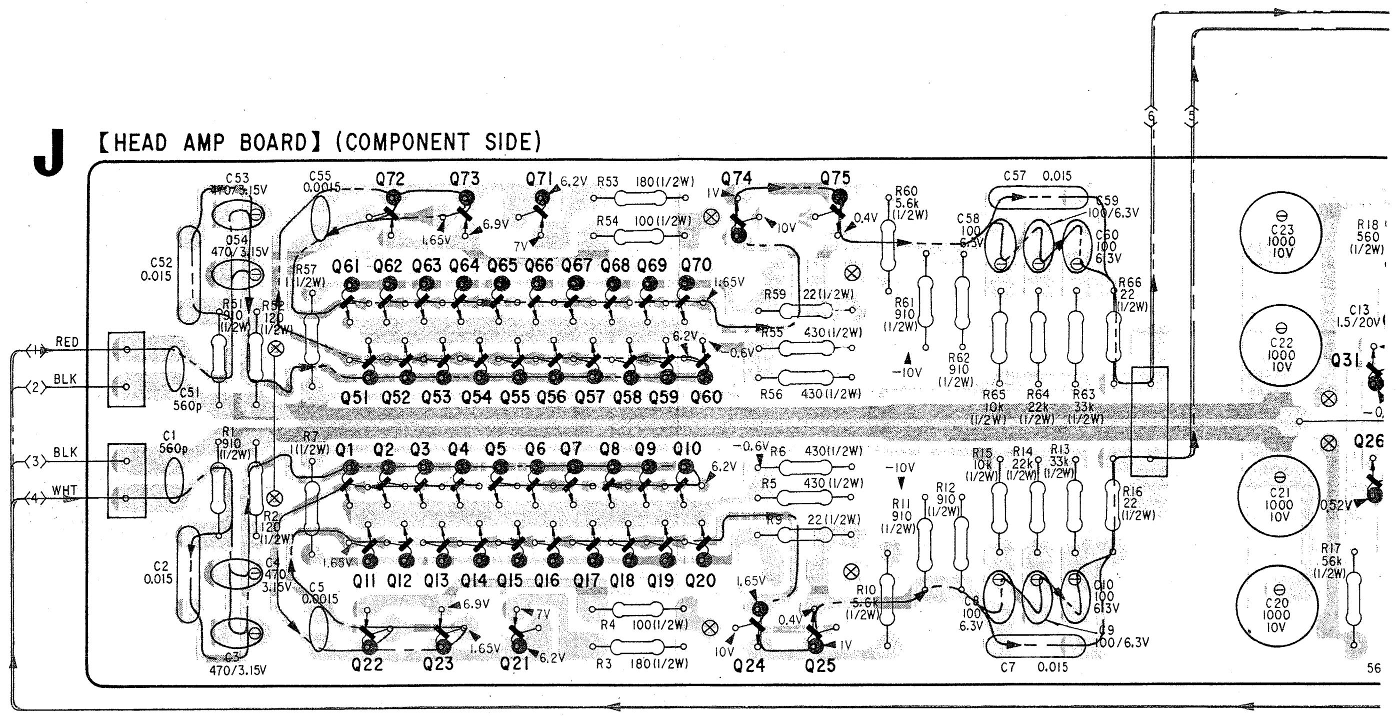
Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

4-2. MOUNTING DIAGRAM

J: HEAD AMP BOARD
K: PHONO 2 SWITCH BOARD

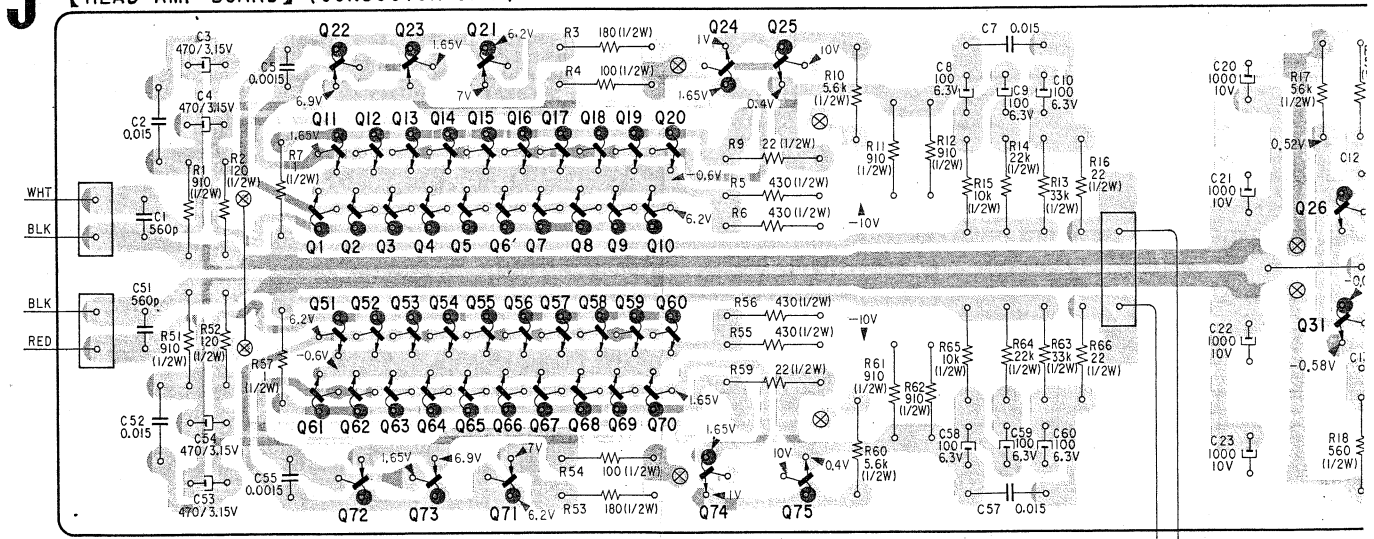


J [HEAD AMP BOARD] (COMPONENT SIDE)



Q	72 73 71 74 75 61 62 63 64 65 66 67 68 69 70 51 52 53 54 55 56 57 58 59 60 3 1 2 3 4 5 6 7 8 9 10 2 11 22 12 13 23 14 15 21 16 17 18 19 20 24 25
D	

J [HEAD AMP BOARD] (CONDUCTOR SIDE)

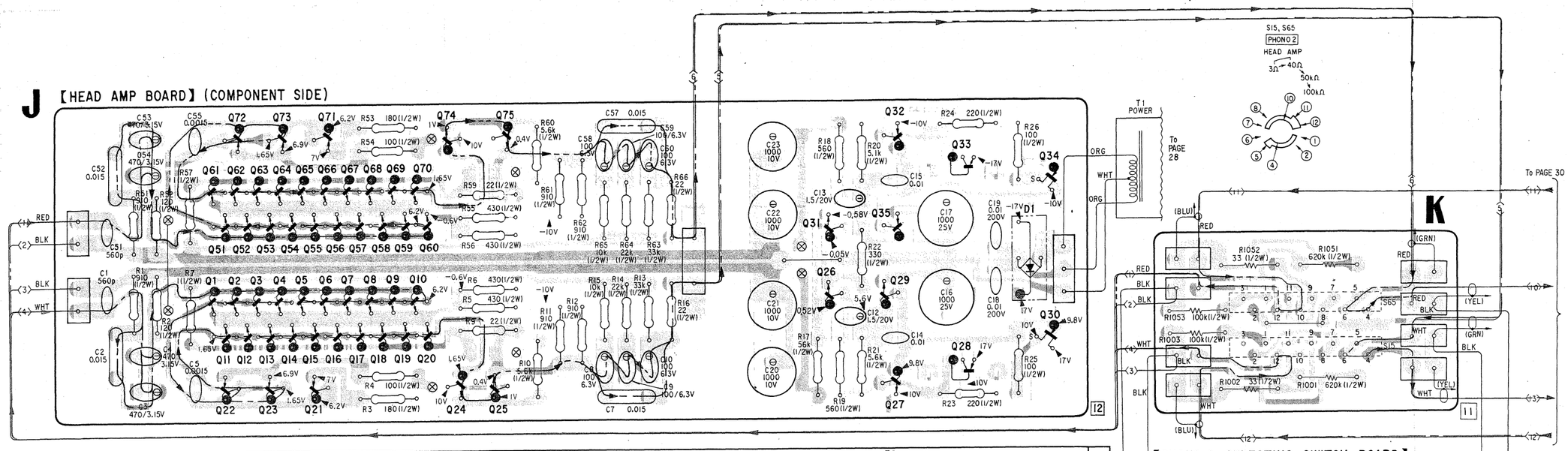


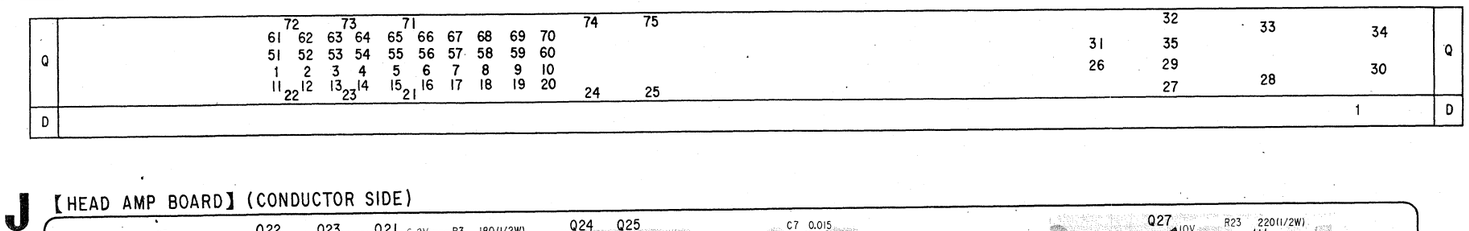
Q	22 23 21 24 25 11 12 13 14 15 16 17 18 19 20 1 2 3 4 5 6 7 8 9 10 26 51 52 53 54 55 56 57 58 59 60 31 61 62 63 64 65 66 67 68 69 70 72 73 71 74 75
D	

4-2. MOUNTING DIAGRAM

J: HEAD AMP BOARD
K: PHONO 2 SWITCH BOARD

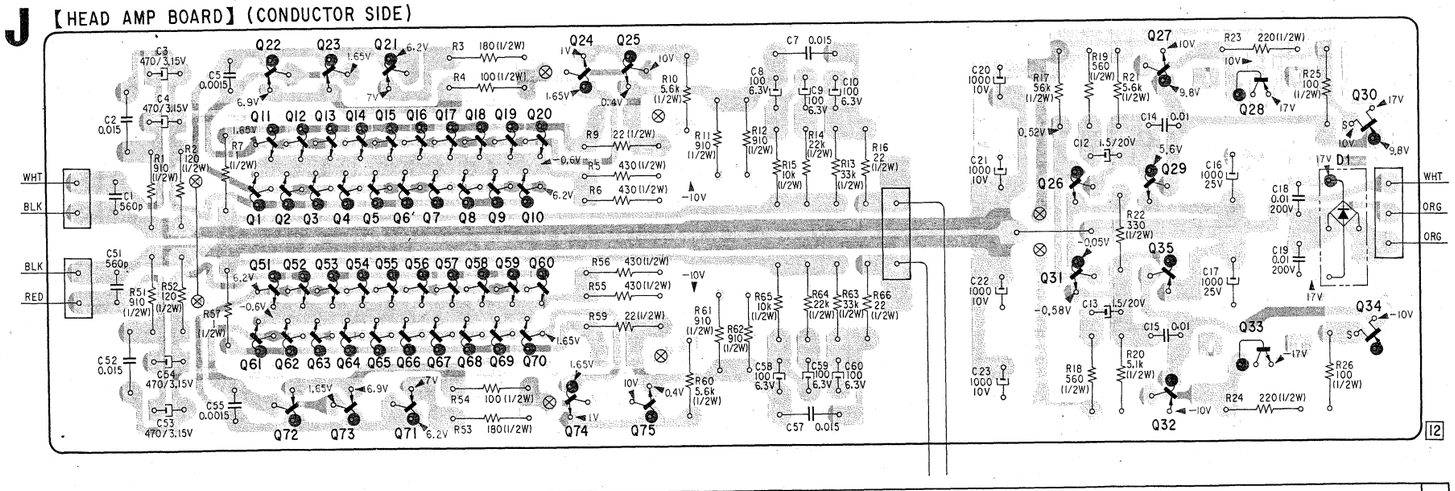
J 【HEAD AMP BOARD】 (COMPONENT SIDE)

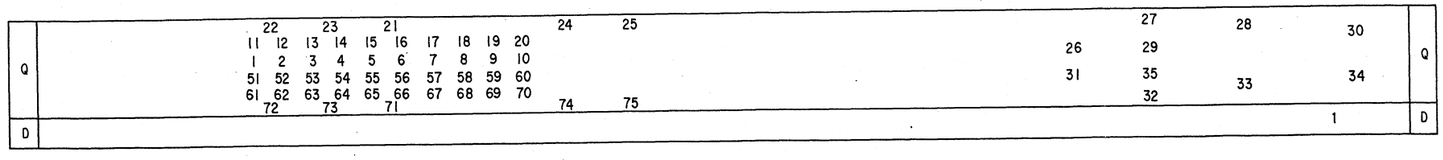




K 【PHONO 2 SELECTING SWITCH BOARD】 (CONDUCTOR SIDE)

J 【HEAD AMP BOARD】 (CONDUCTOR SIDE)

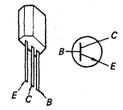




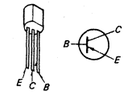
Replacement Semiconductors

For replacement, use semiconductors except in ( ).

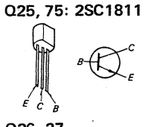
Q1–20, Q51–70): 2SC1637-0



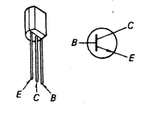
Q21–23, Q71–73): (2SA872) 2SA872-E



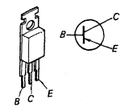
Q24, 74:(2SC1775) 2SC1775-E
Q25, 75: 2SC1811



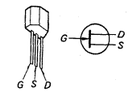
Q26, 27 Q29, 31): 2SC1362



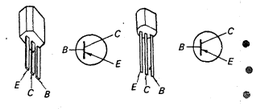
Q28: 2SA671



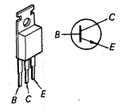
Q30, 34: 2SK42-2



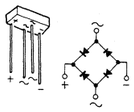
Q32, 35: (2SA705) 2SA872-D



Q33: 2SC1061

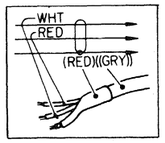


D1: SIRB10



Note:

- Color code of sleeving over the end of the jacket.

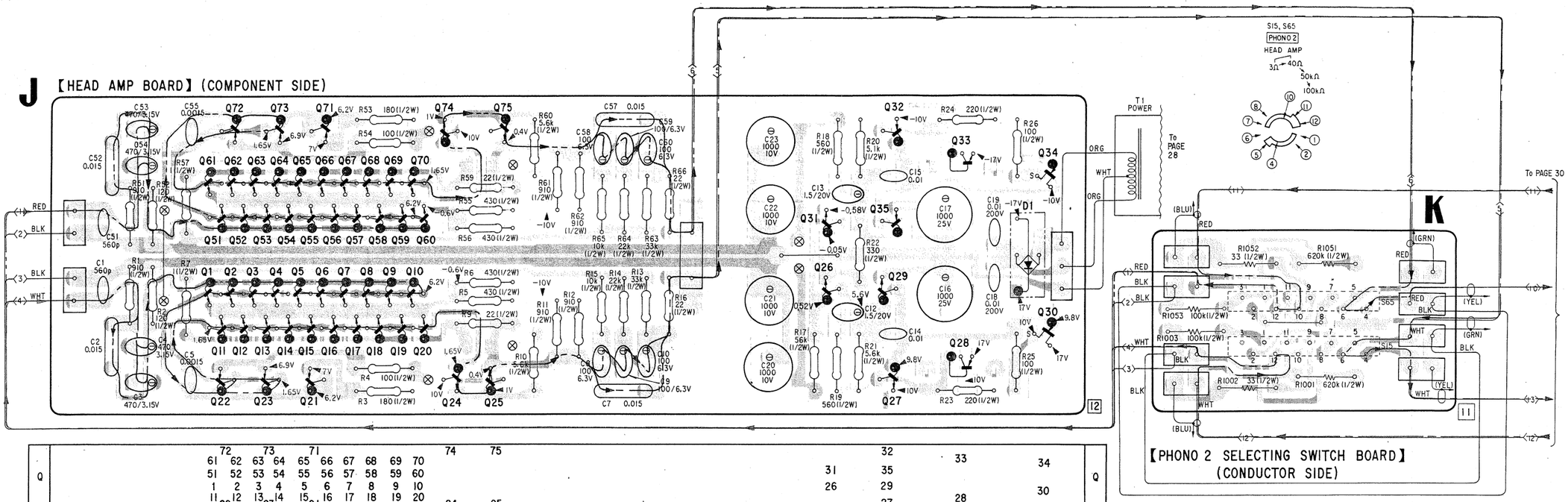


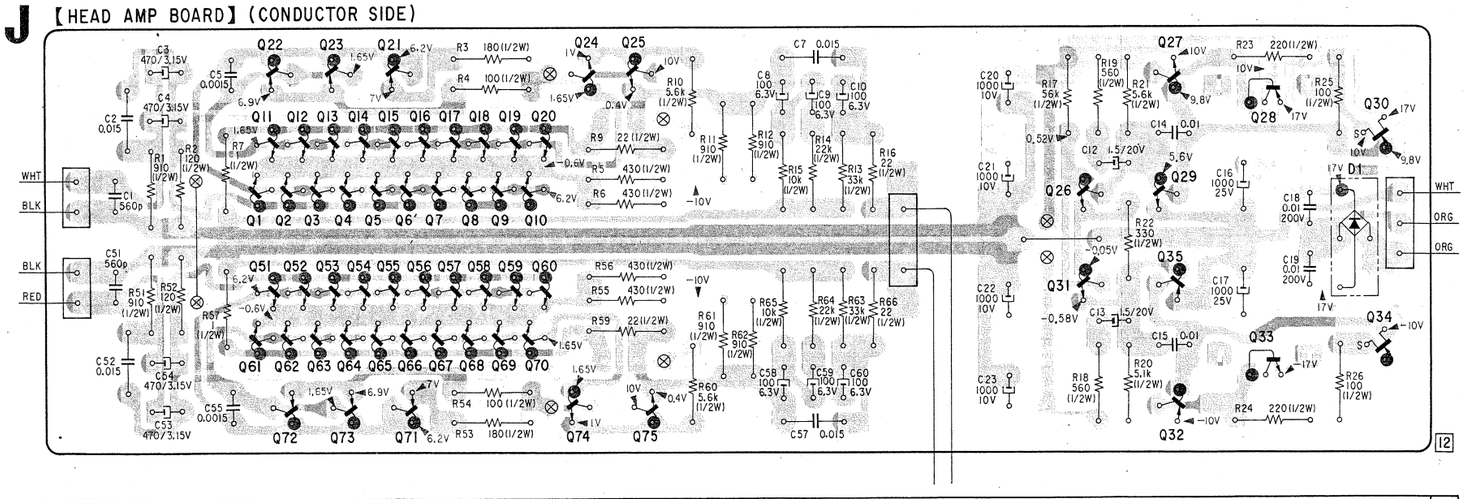
- ⊗ : Through hole.
- : B+ pattern
- : B— pattern
- Signal Path
  ——→: L-CH
  - - -→: R-CH
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).

4-2. MOUNTING DIAGRAM

J: HEAD AMP BOARD
K: PHONO 2 SWITCH BOARD

J 【HEAD AMP BOARD】 (COMPONENT SIDE)



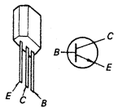


J 【HEAD AMP BOARD】 (CONDUCTOR SIDE)

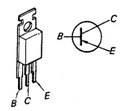
Replacement Semiconductors

For replacement, use semiconductors except in ( ).

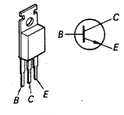
Q1–20, Q51–70: 2SC1637-0



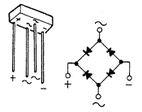
Q28: 2SA671



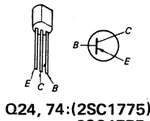
Q33: 2SC1061



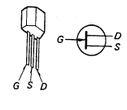
D1: SIRB10



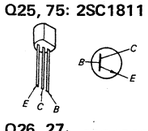
Q21–23, Q71–73: (2SA872) 2SA872-E



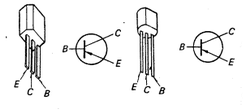
Q30, 34: 2SK42-2



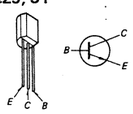
Q24, 74: (2SC1775) 2SC1775-E
Q25, 75: 2SC1811



Q32, 35: (2SA705) 2SA872-D

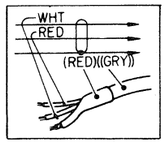


Q26, 27, 29, 31: 2SC1362



Note:

- Color code of sleeving over the end of the jacket.



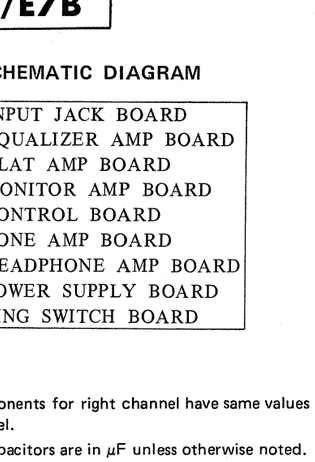
- ⊗ : Through hole.
- : B+ pattern
- : B– pattern
- Signal Path
  ——→: L-CH
  - - -→: R-CH
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).

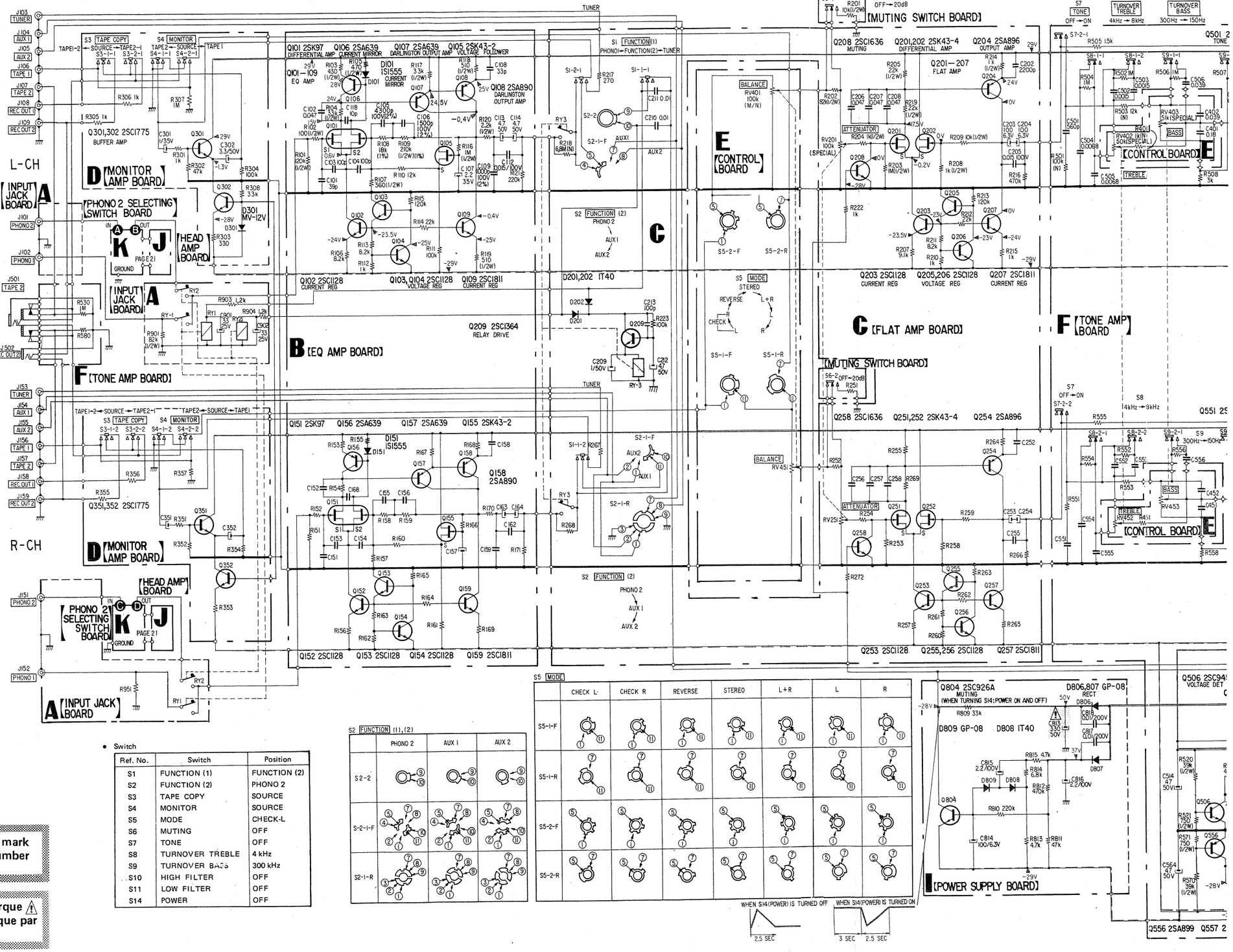
4-3. SCHEMATIC DIAGRAM

A: INPUT JACK BOARD
B: EQUALIZER AMP BOARD
C: FLAT AMP BOARD
D: MONITOR AMP BOARD
E: CONTROL BOARD
F: TONE AMP BOARD
G: HEADPHONE AMP BOARD
I: POWER SUPPLY BOARD
MUTING SWITCH BOARD

Note:

- Components for right channel have same values as for left channel.
- All capacitors are in μF unless otherwise noted. pF = μμF 50WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ = 1000 Ω, MΩ = 1000 kΩ
- ▭: nonflammable resistor.
- ▭: fusible resistor.
- (N) : low-noise resistor.
- ———: B+ bus.
- ▭: panel designation.
- – – –: B– bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).



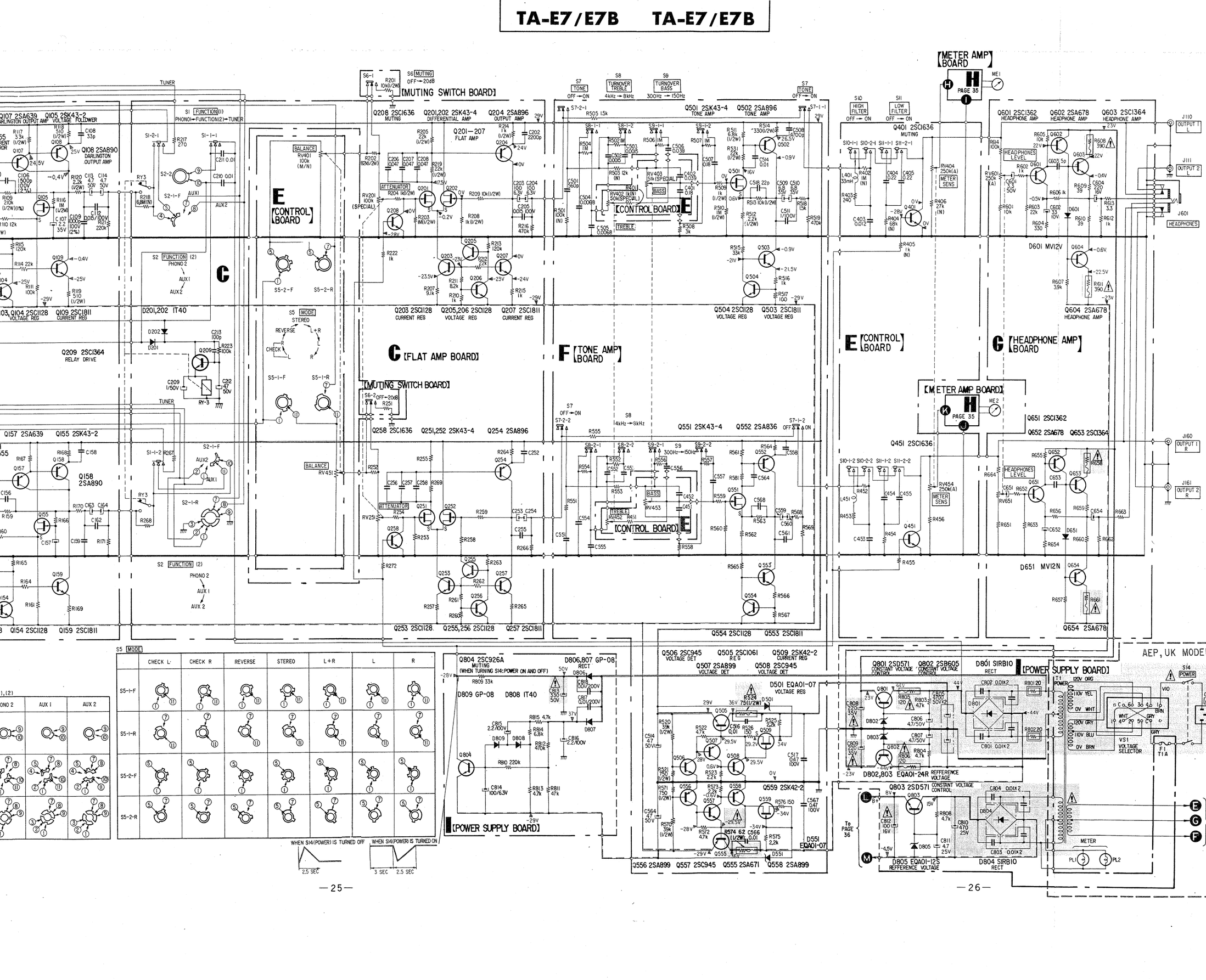


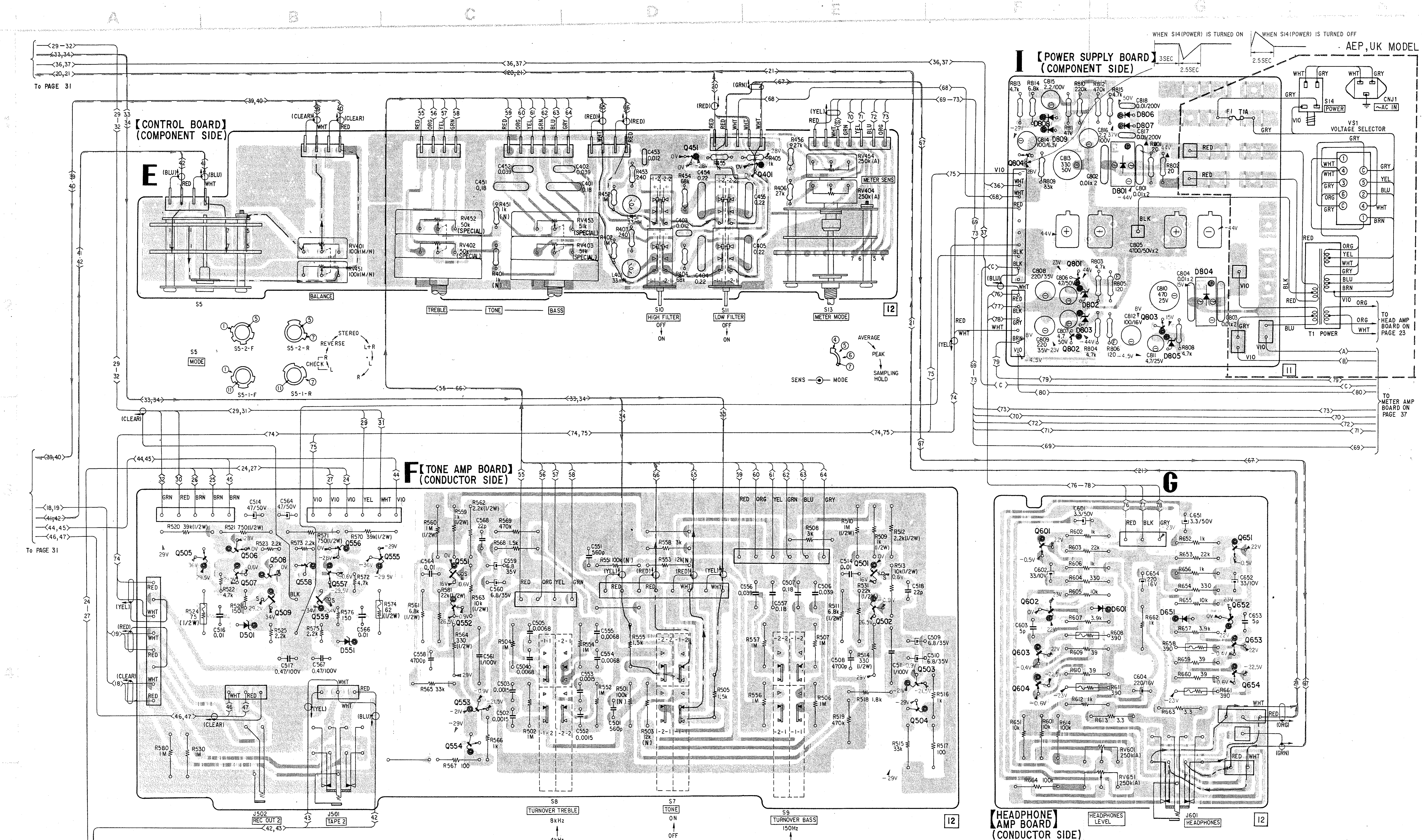
- Switch

Ref. No.	Switch	Position
S1	FUNCTION (1)	FUNCTION (2)
S2	FUNCTION (2)	PHONO 2
S3	TAPE COPY	SOURCE
S4	MONITOR	SOURCE
S5	MODE	CHECK-L
S6	MUTING	OFF
S7	TONE	OFF
S8	TURNOVER TREBLE	4 kHz
S9	TURNOVER BASS	300 kHz
S10	HIGH FILTER	OFF
S11	LOW FILTER	OFF
S14	POWER	OFF

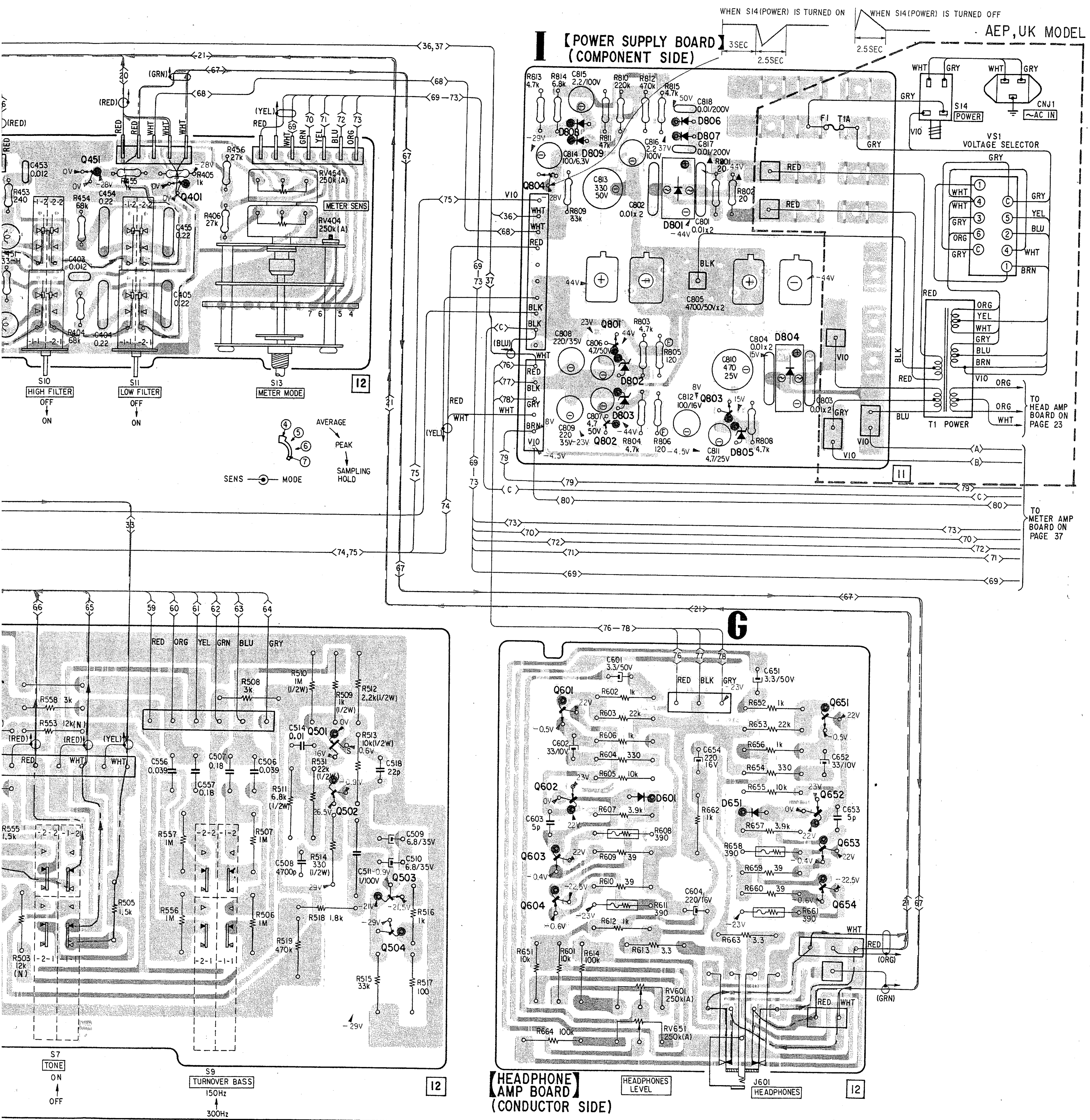
Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

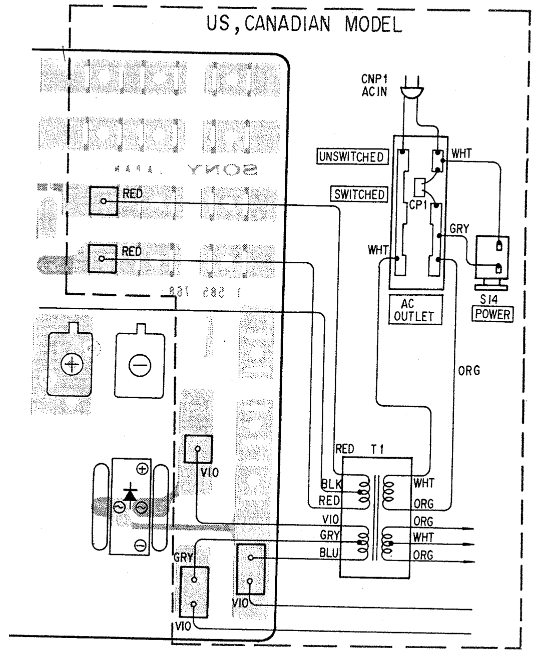

[MUTING SWITCH BOARD]
[CONTROL BOARD] E
[FLAT AMP BOARD] C
[TONE AMP BOARD] F
[METER AMP BOARD] H
[HEADPHONE AMP BOARD] G
[POWER SUPPLY BOARD]
AEP, UK MODEL
TUNER
PHONO1 FUNCTION(1) TUNER
PHONO 2 AUX 1 AUX 2
MUTING OFF -20dB
TONE OFF ON
TURNOVER TREBLE 4kHz 8kHz
TURNOVER BASS 300Hz 150Hz
HIGH FILTER OFF ON
LOW FILTER OFF ON
BALANCE
ATTENUATOR
TREBLE
BASS
METER SENS
HEADPHONES LEVEL
Q208 2SC1636 MUTING
Q201,202 2SK43-4 DIFFERENTIAL AMP
Q204 2SA896 OUTPUT AMP
Q201-207 FLAT AMP
Q501 2SK43-4 TONE AMP
Q502 2SA896 TONE AMP
Q401 2SC1636 MUTING
Q601 2SC1362 HEADPHONE AMP
Q602 2SA678 HEADPHONE AMP
Q603 2SC1364 HEADPHONE AMP
Q604 2SA678 HEADPHONE AMP
Q203 2SC1128 CURRENT REG
Q205,206 2SC1128 VOLTAGE REG
Q207 2SC1811 CURRENT REG
Q504 2SC1128 VOLTAGE REG
Q503 2SC1811 VOLTAGE REG
Q107 2SA639 Q105 2SK43-2 VOLTAGE FOLLOWER
Q108 2SA890 DARLINGTON OUTPUT AMP
Q103,Q104 2SC1128 VOLTAGE REG
Q109 2SC1811 CURRENT REG
Q209 2SC1364 RELAY DRIVE
D201,202 IT40
Q157 2SA639 Q155 2SK43-2
Q158 2SA890
Q159 2SC1811
Q154 2SC1128
Q258 2SC1636 MUTING
Q251,252 2SK43-4 DIFFERENTIAL AMP
Q254 2SA896 OUTPUT AMP
Q253 2SC1128 CURRENT REG
Q255,256 2SC1128 VOLTAGE REG
Q257 2SC1811 CURRENT REG
Q551 2SK43-4 TONE AMP
Q552 2SA836 TONE AMP
Q554 2SC1128 VOLTAGE REG
Q553 2SC1811 VOLTAGE REG
Q451 2SC1636 MUTING
Q651 2SC1362 HEADPHONE AMP
Q652 2SA678 HEADPHONE AMP
Q653 2SC1364 HEADPHONE AMP
Q654 2SA678 HEADPHONE AMP
D601 MV12V
D651 MV12N
Q804 2SC926A MUTING (WHEN TURNING SI4:POWER ON AND OFF)
D806,807 GP-08 RECT
D809 GP-08 D808 IT40
Q506 2SC945 VOLTAGE DET
Q505 2SC1061 REG
Q509 2SK42-2 CURRENT REG
Q507 2SA899 VOLTAGE DET
Q508 2SC945 VOLTAGE DET
D501 EQA01-07 VOLTAGE REG
Q556 2SA899 Q557 2SC945 Q555 2SA671 Q558 2SA899
D551 EQA01-07
Q801 2SD571 CONSTANT VOLTAGE CONTROL
Q802 2SB605 CONSTANT VOLTAGE CONTROL
D801 SIRB10 RECT
D802,803 EQA01-24R REFFERENCE VOLTAGE
Q803 2SD571 CONSTANT VOLTAGE CONTROL
D805 EQA01-12S REFFERENCE VOLTAGE
D804 SIRB10 RECT
SELECTOR POSITION 110V 120V 220V 240V
S14 POWER
VS1 VOLTAGE SELECTOR
F1 T1A
CNJ1 AC IN
TO HEAD AMP BOARD ON PAGE 21
To PAGE 36
S5 MODE
CHECK L
CHECK R
REVERSE
STEREO
L+R
L
R
S5-1-F
S5-1-R
S5-2-F
S5-2-R
WHEN S14(POWER) IS TURNED OFF
WHEN S14(POWER) IS TURNED ON
2.5 SEC
3 SEC
2.5 SEC



Q	505, 506, 507, 508, 509, 558, 557, 559, 556, 555, 551, 552, 553, 554, 451, 401, 501, 502, 503, 504, 804, 601, 603, 604, 602, 801, 802, 803, 652, 651, 653, 654
D	501, 551, 808, 809, 802, 803, 601, 806, 807, 801, 805, 651, 804



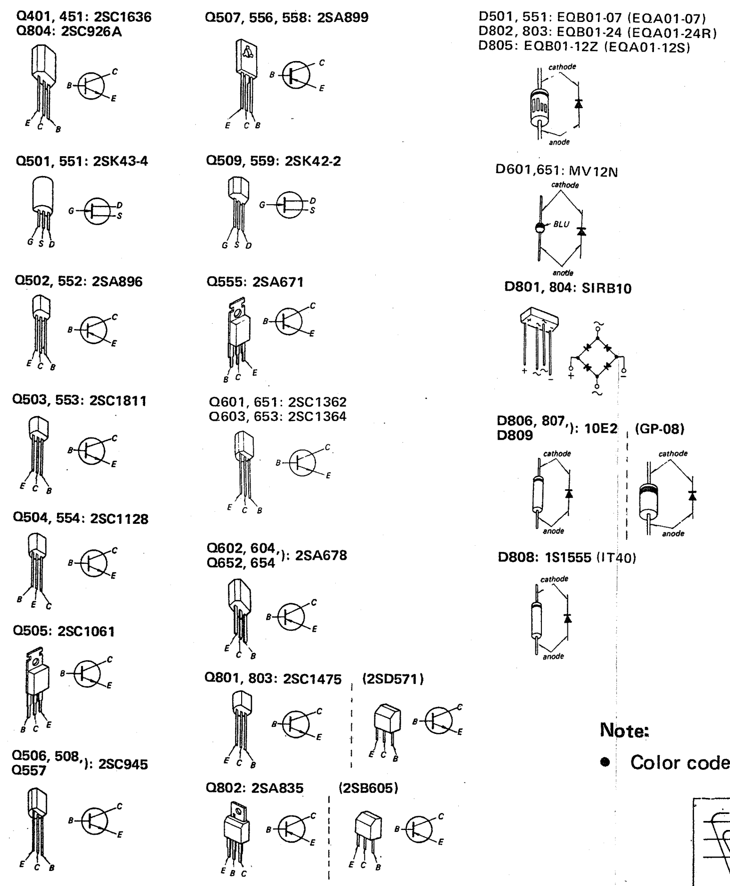
451	401	501 502	503 504	804 603 604 601 602	801 802	803	652 651 653 654	Q
				808 809	802 803 601	806 807 801 805	651 804	D



- : B+ pattern
- : B− pattern
- Signal Path
  - : L-CH
  - : R-CH
- ▲ : nonflammable resistor.
- Ⓕ : fusible resistor.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).

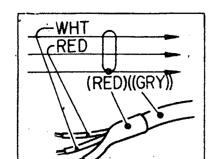
Replacement Semiconductors

For replacement, use semiconductors except in ( ).



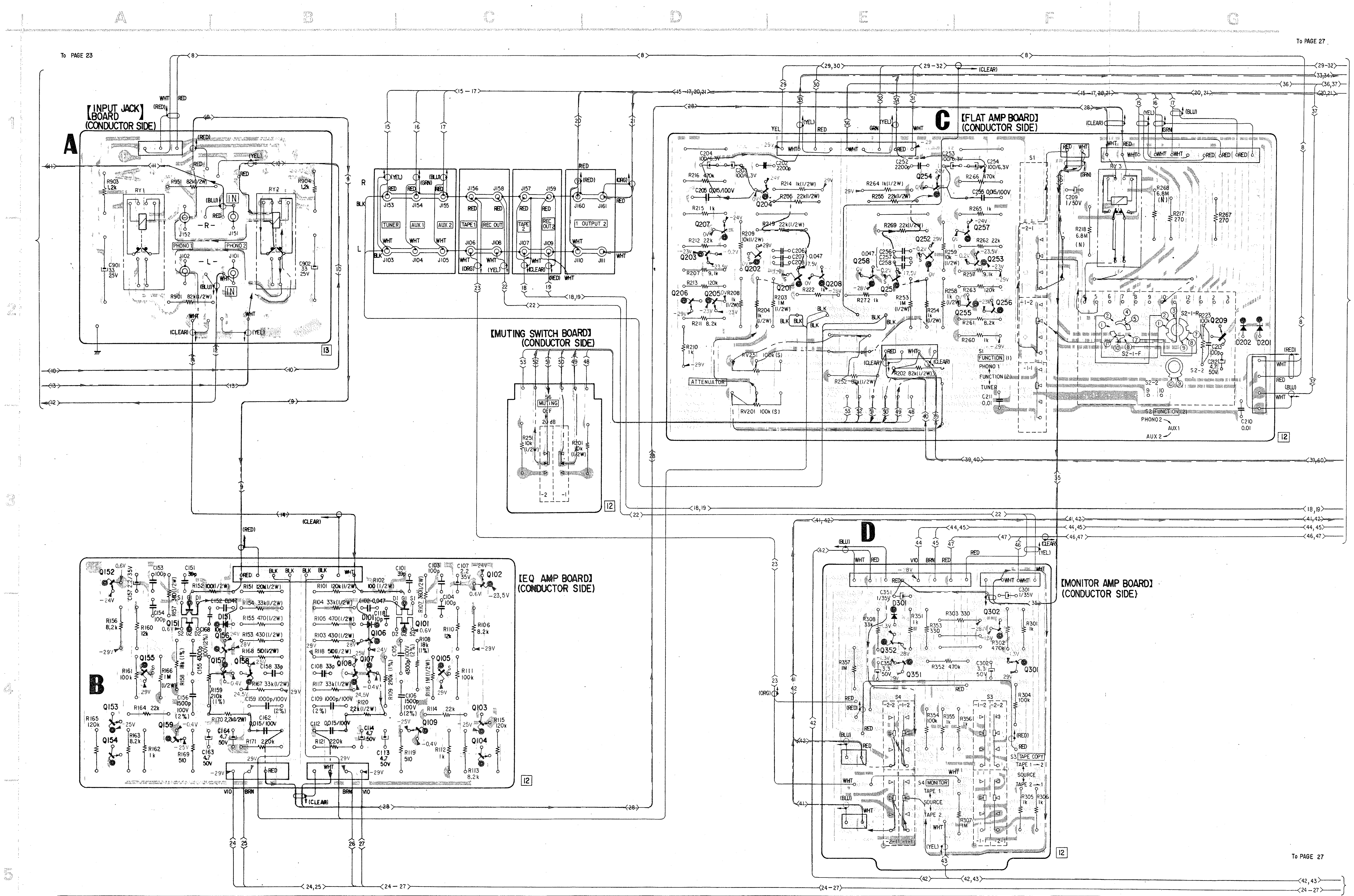
Note:

- Color code of sleeving over the end of the jacket.



4-5. MOUNTING DIAGRAM

A: INPUT JACK BOARD	C: FLAT AMP BOARD	MUTING SWITCH BOARD
B: EQUALIZER AMP BOARD	D: MONITOR AMP BOARD	F: TONE AMP BOARD

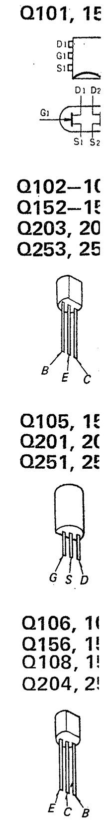


Q	152 153 154 155 159 151 156 157 158 108 106 107 101 109 105 102 103 104 206 203 207 205 202 204 201 208 258 251 352,351 254 252 257 253 255 256 302 301 209	Q
D	151 101 301 202 201	D

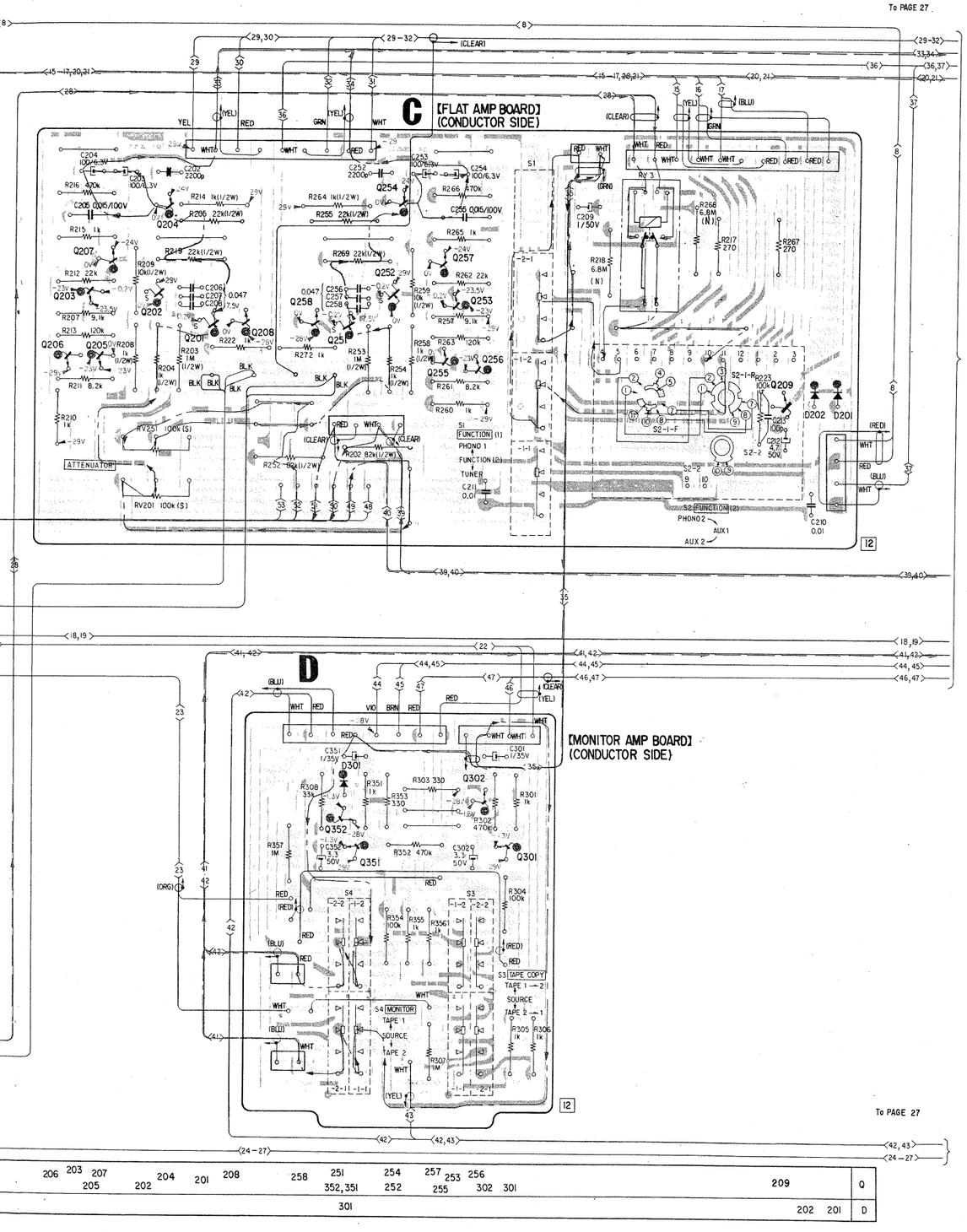
Note:
- Colo

- ■
- Signa
- Volta note
- Read VOM

Replacem
For repla in ( ).

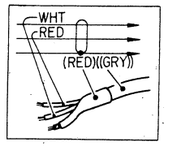


SWITCH BOARD
AMP BOARD



Note:

- Color code of sleeving over the end of the jacket.

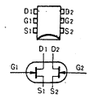


- ■ : part mounted on the conductor side.
- : B+ pattern
- : B− pattern
- Signal Path
  ——▶: L-CH
  ----▶: R-CH
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).

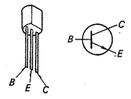
Replacement Semiconductors

For replacement, use semiconductors except in ( ).

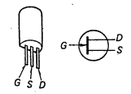
Q101, 151: 2SK97



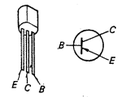
Q102–104, Q152–154 Q203, 205, 206 Q253, 255, 256: (2SC1128) 2SC2009



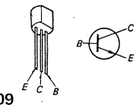
Q105, 155: 2SK43-2
Q201, 202,): 2SK43-4
Q251, 252



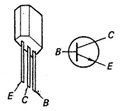
Q106, 107,): 2SA639S (2SA639)
Q156, 157)
Q108, 158: (2SA890) 2SA896
Q204, 254: 2SA896



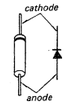
Q109, 159,): 2SC1811
Q207, 257
Q301, 302,): (2SC1775) 2SC1775-E
Q351, 352



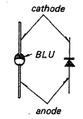
Q208, 209, 258,): 2SC1636
Q401, 451



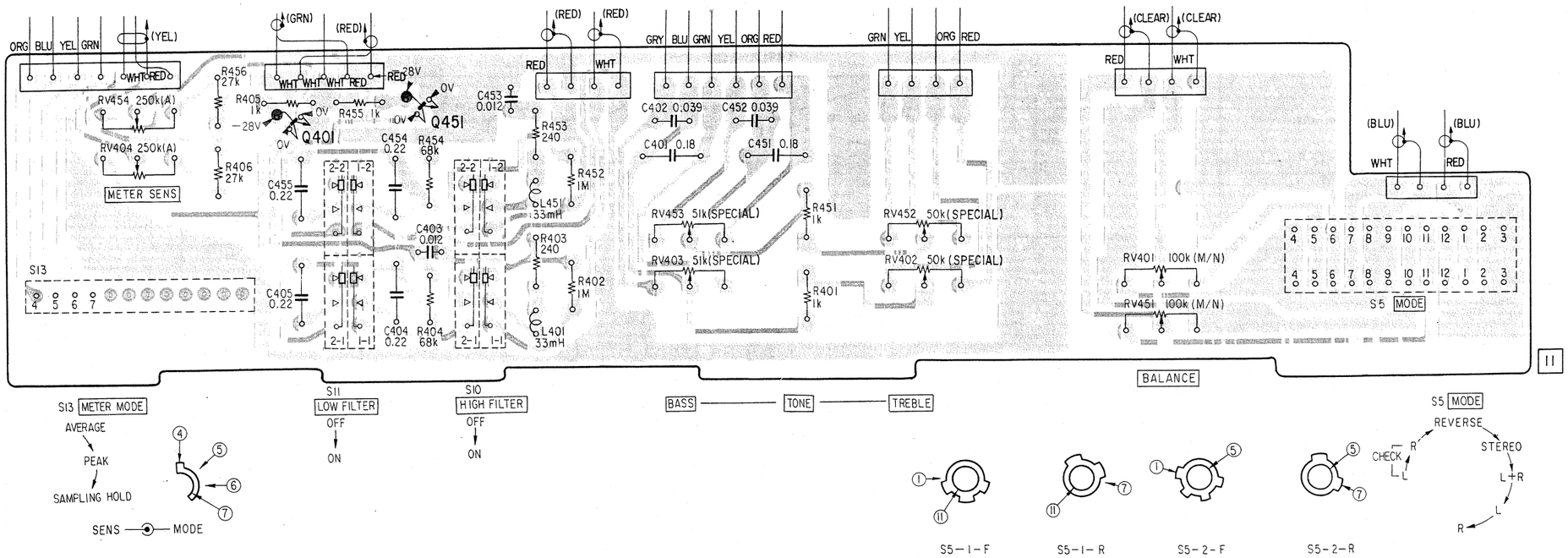
D101, 151: 1S1555 (MV12N)
D201, 202,): 1S1555 (1T40)
D808



D301: MV-12N

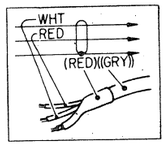


[CONTROL BOARD] (CONDUCTOR SIDE)



Note:

- Color code of sleeving over the end of the jacket.



- ■ : part mounted on the conductor side.

- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).

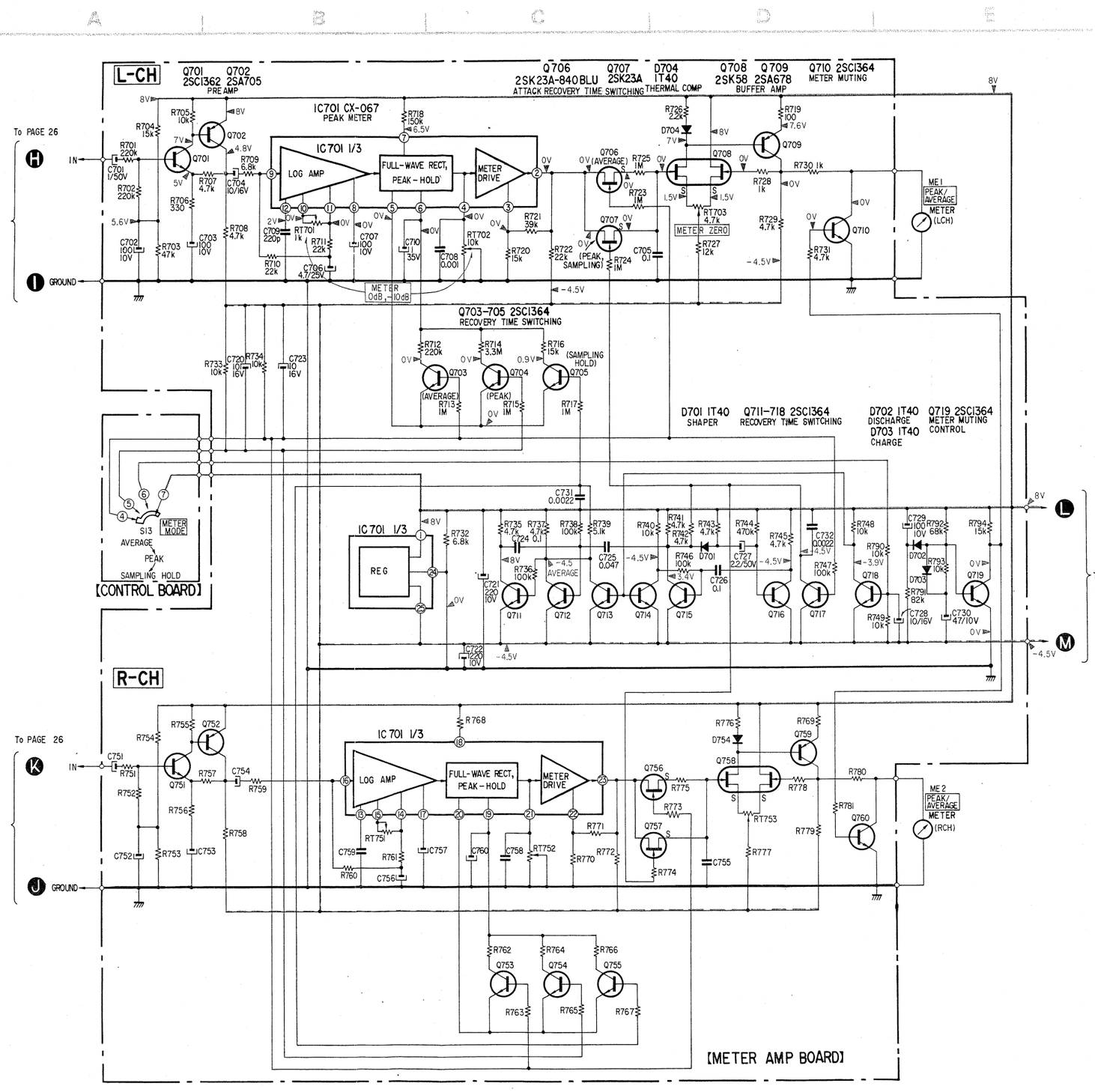
4-6. SHCEMATIC DIAGRAM

H: METER AMP BOARD

Note:

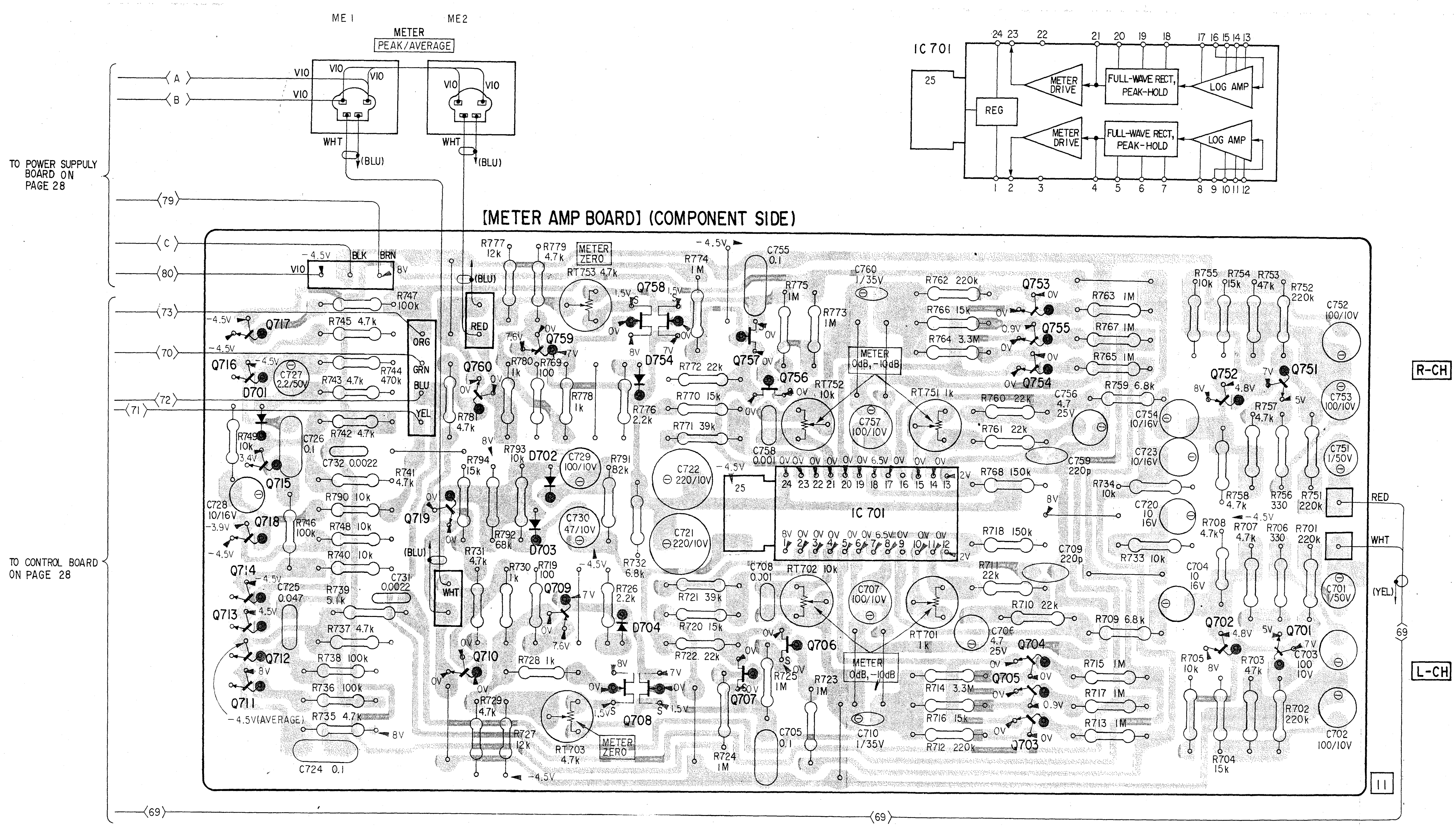
- Components for right channel have same values as for left channel.
- All capacitors are in μF unless otherwise noted. pF = μμF 50WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ = 1000 Ω, MΩ = 1000 kΩ
- (N) : low-noise resistor.
- ——— : B+ bus.
- ▭ : panel designation.
- ▭ : adjustment for repair.
- — — — : B— bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).
- Switch

Ref. No.	Switch	Position
S13	METER MODE	AVERAGE



4-7. MOUNTING DIAGRAM H: METER AMP BOARD

– Component Side –

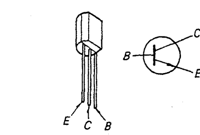


717 716 715 718 714 713 712 711	760 719 710	759 709	758 708	757 707	756 706	IC701	753 755 754 704 705 703	752 702	751 701	Q IC
701		702 703	754 704							D

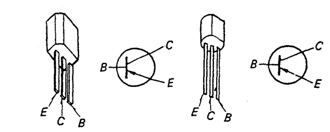
Replacement Semiconductor

For replacement, use semiconductors except in ( ).

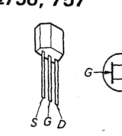
Q701, 751: 2SC1362
Q703–705, Q710–719, Q753–755,760 : 2SC1364



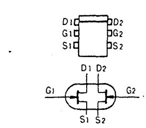
Q702, 752: (2SA705), 2SA872D
Q709, 759: 2SA678



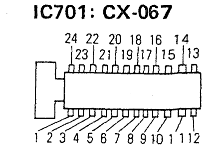
Q706, 707, Q756, 757: 2SK23A-840 blue



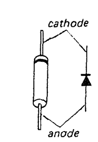
Q708, 758: 2SK58



IC701: CX-067

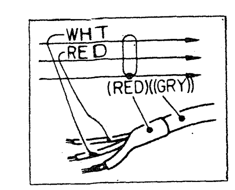


D701–704, 754: 1S1555 (1T40)



Note:

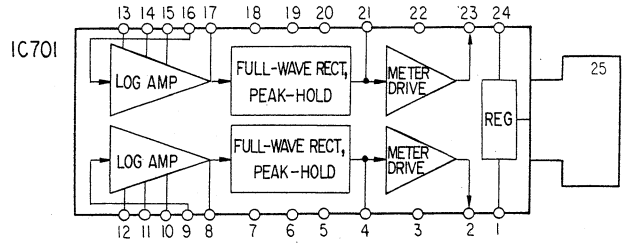
- Color code of sleeving over the end of the jacket.

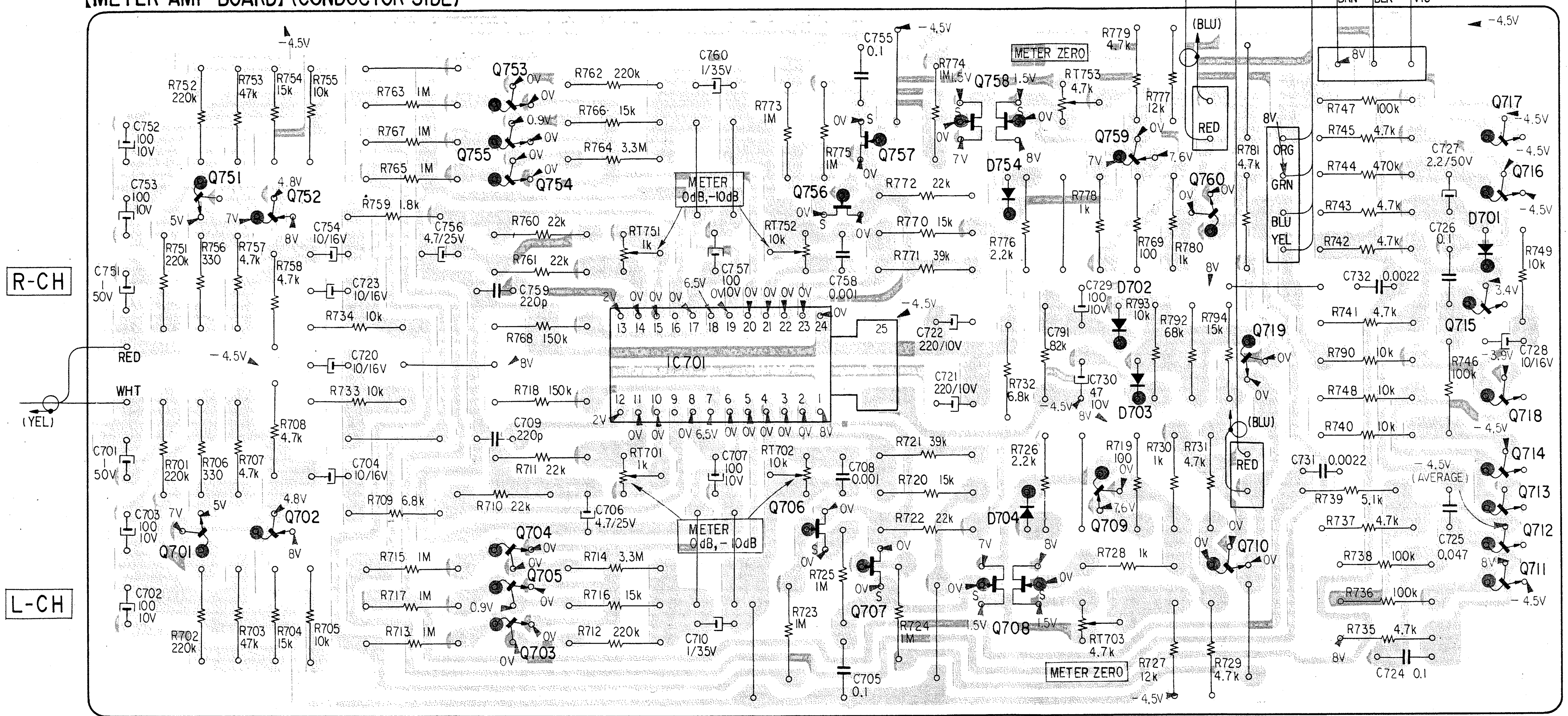


- : B+ pattern
- : B– pattern
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).

4-8. MOUNTING DIAGRAM [H: METER AMP BOARD]

– Conductor Side –



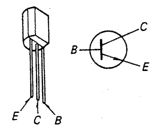


Q IC	751 701	752 702	753 755 754 704 705 703	IC701	756 706	757 707	758 708	759 709	760 719 710		717 716 715 718 714 713 712 711
D							754 704	702 703			701

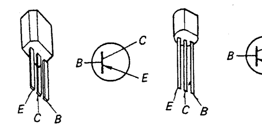
Replacement Semiconductor

For replacement, use semiconductors except in ( ).

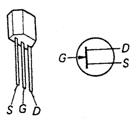
Q701, 751: 2SC1362
Q703–705, Q710–719, Q753–755,760 : 2SC1364



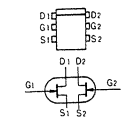
Q702, 752: (2SA705), 2SA872D
Q709, 759: 2SA678



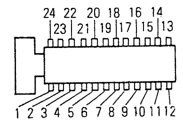
Q706, 707, Q756, 757: 2SK23A-840 blue



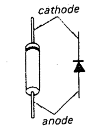
Q708, 758: 2SK58



IC701: CX-067

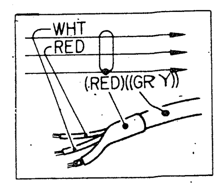


D701–704, 754: 1S1555 (1T40)



Note:

- Color code of sleeving over the end of the jacket.

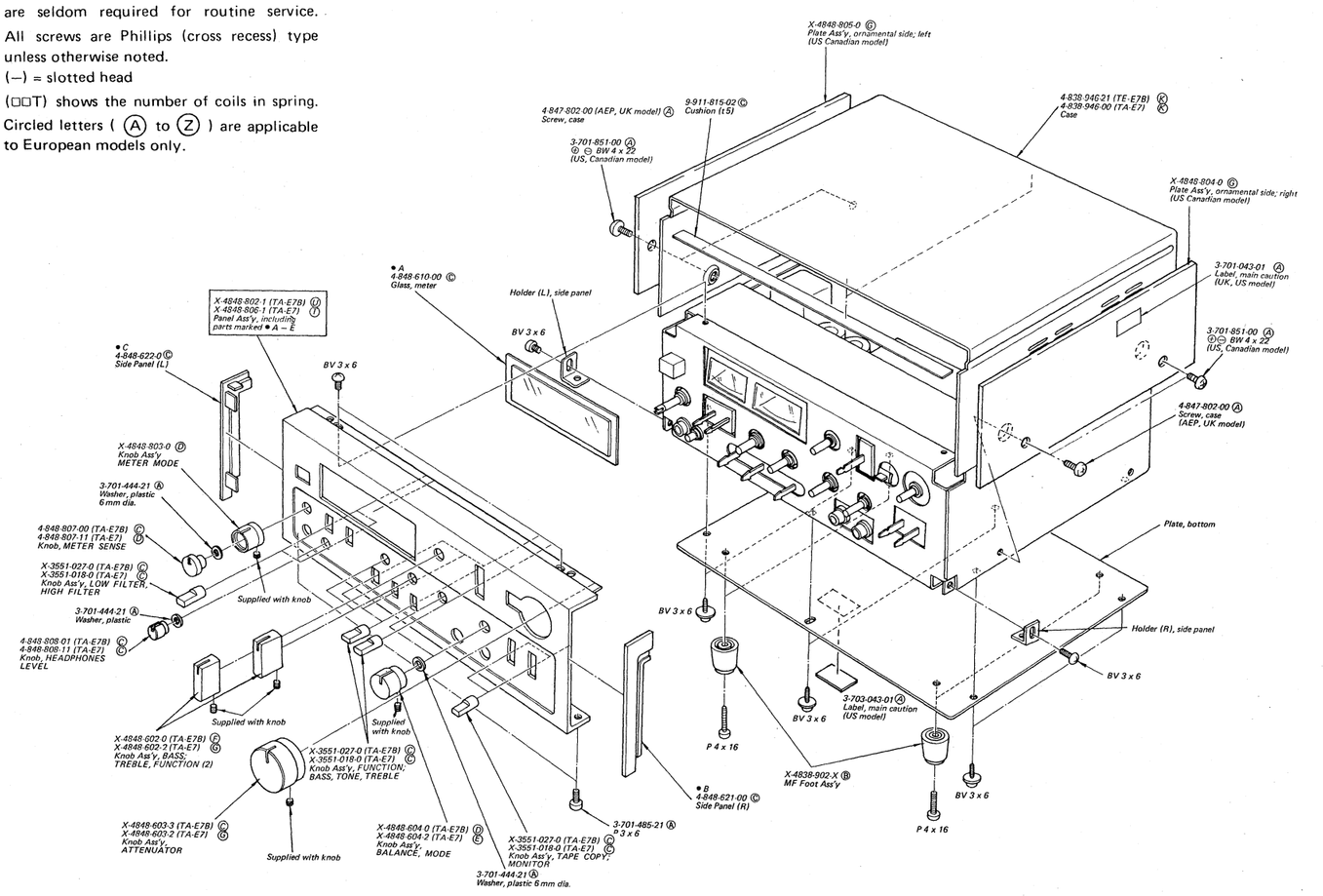


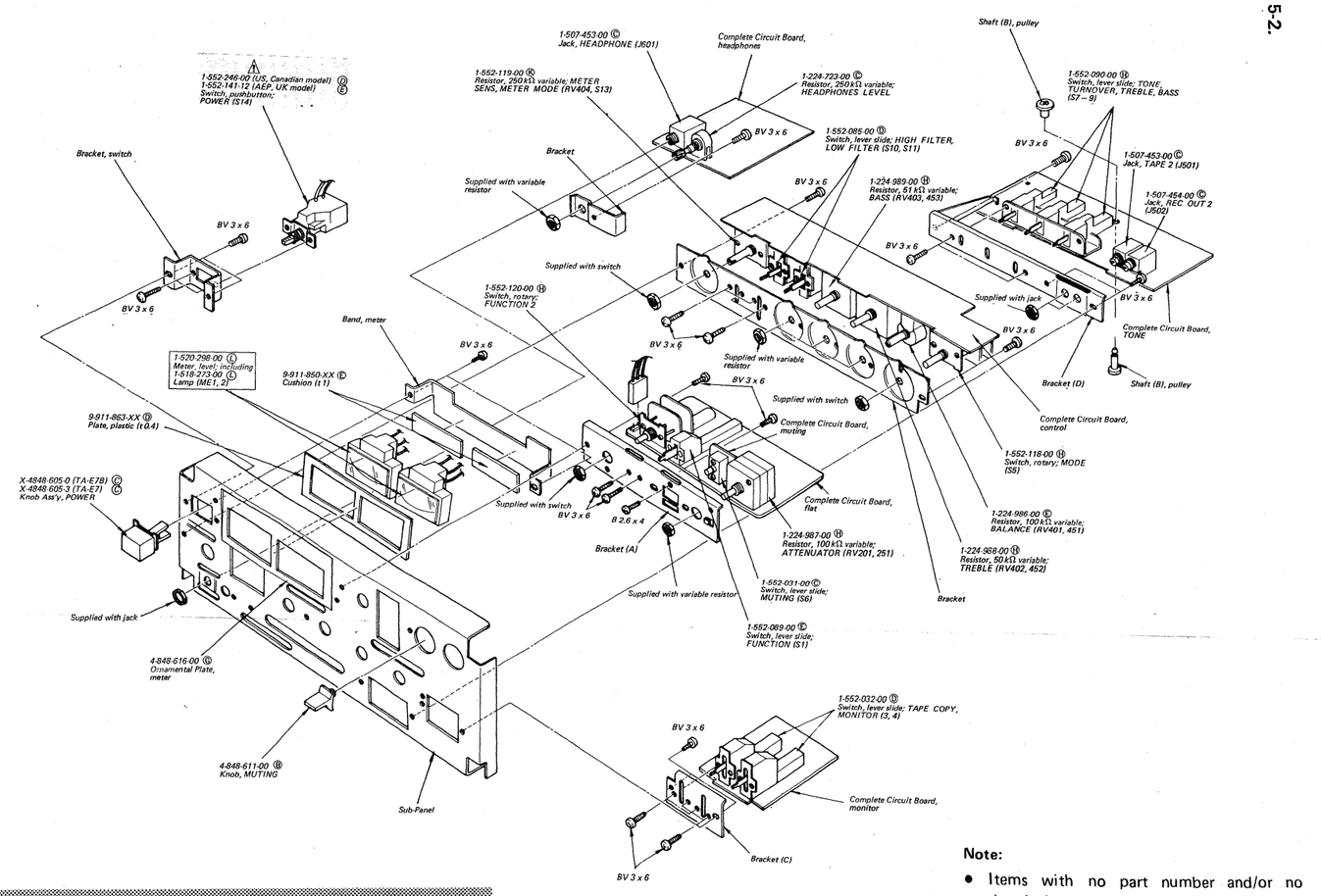
- : B+ pattern
- : B– pattern
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).

Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- (□□T) shows the number of coils in spring.
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

5-1.





Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

5-2.

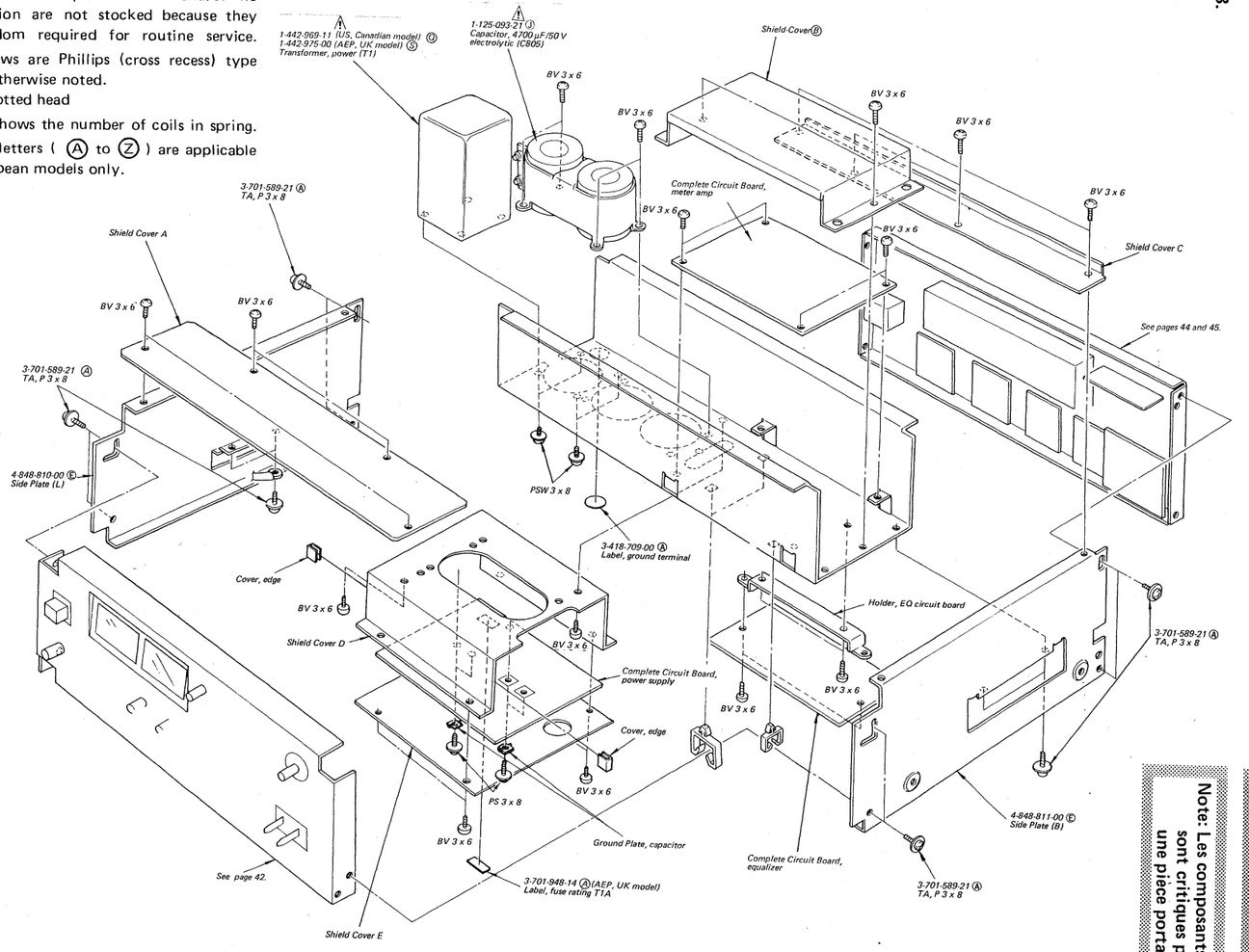
Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- (□□T) shows the number of coils in spring.
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

5-3.

Note:

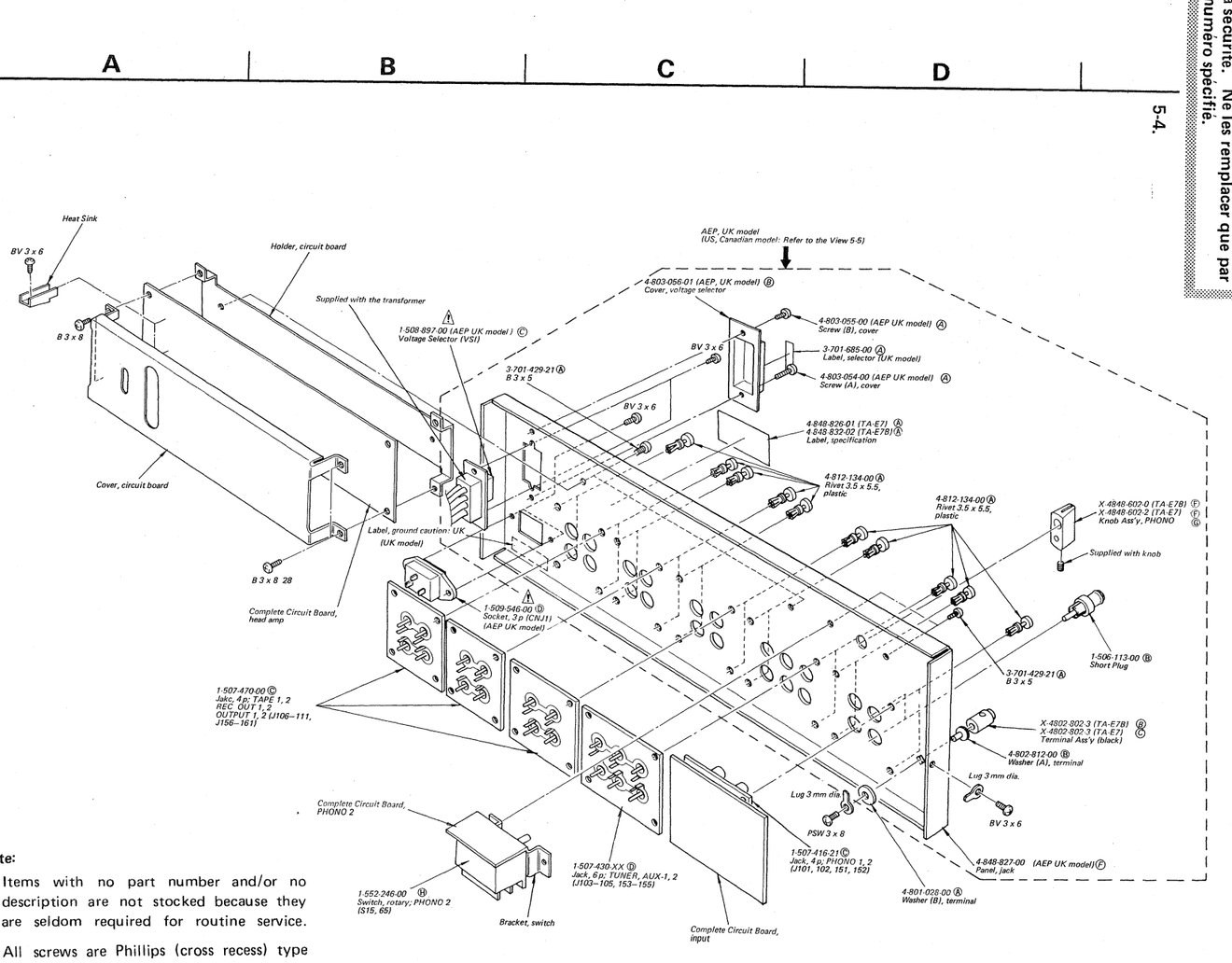
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (—) = slotted head
- (□□T) shows the number of coils in spring.
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.



Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

5-4.



Note:

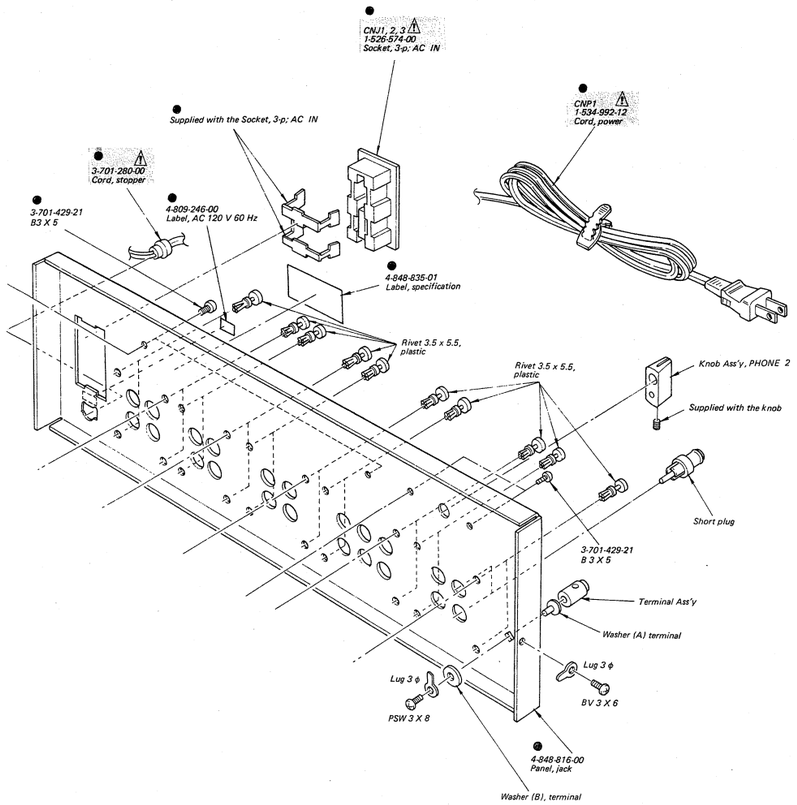
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (—) = slotted head
- (□□T) shows the number of coils in spring.
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

A B C D

1 2 3 4 5

5-5.

US, Canadian model
(Refer to the view 5-4 for part numbers except the mark ●)



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (—) = slotted head
- (□□T) shows the number of coils in spring.

Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

SECTION 7
ELECTRICAL PARTS LIST

• Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	Part No.	Description
		SEMICONDUCTORS
		Transistors
Q1-20	8-761-700-00	Ⓑ 2SC1637-0
⇒Q21-23	8-729-387-28	Ⓑ 2SA872-E
⇒Q24	8-729-377-58	Ⓑ 2SC1775-E
Q25	8-765-012-20	Ⓒ 2SC1811
Q26, 27	8-729-665-47	Ⓑ 2SC1362
Q28	8-729-317-12	Ⓔ 2SA671
Q29	8-729-665-47	Ⓑ 2SC1362
Q30	8-727-312-00	Ⓒ 2SK42-2
Q31	8-729-665-47	Ⓑ 2SC1362
⇒Q32	8-729-387-27	Ⓑ 2SA872-D
Q33	8-729-316-12	Ⓓ 2SC1061
Q34	8-727-312-00	Ⓒ 2SK42-2
⇒Q35	8-729-387-27	Ⓑ 2SA872-D
Q51-70	8-761-700-00	Ⓑ 2SC1637-0
⇒Q71-73	8-729-387-28	Ⓑ 2SA872-E
⇒Q74	8-729-377-58	Ⓑ 2SC1775-E
Q75	8-765-012-00	Ⓒ 2SC1811
Q101	8-765-342-10	Ⓕ 2SK97
⇒Q102–104	8-765-300-00	Ⓒ 2SC2009
Q105	8-723-302-00	Ⓒ 2SK43-2
⇒Q106, 107	8-729-163-93	Ⓒ 2SA639S
⇒Q108	8-765-082-20	Ⓒ 2SA896
Q109	8-765-012-20	Ⓒ 2SC1811
Q151	8-765-342-10	Ⓕ 2SK97
⇒Q152-154	8-765-300-00	Ⓒ 2SC2009
Q155	8-723-302-00	Ⓒ 2SK43-2
⇒Q156, 157	8-729-163-93	Ⓒ 2SA639S
⇒Q158	8-765-082-20	Ⓒ 2SA896
Q159	8-765-012-20	Ⓒ 2SC1811
Q201, 202	8-723-304-00	Ⓔ 2SK43-4
⇒Q203	8-765-300-00	Ⓒ 2SC2009
⇒Q204	8-765-082-20	Ⓒ 2SA896
⇒Q205, 206	8-765-300-00	Ⓒ 2SC2009
Q207	8-765-012-20	Ⓒ 2SC1811
Q208	8-761-622-00	Ⓑ 2SC1636
Q209	8-729-663-00	Ⓑ 2SC1364
Q251, 252	8-723-304-00	Ⓔ 2SK34-4
⇒Q253	8-765-300-00	Ⓒ 2SC2009
⇒Q254	8-765-082-00	Ⓒ 2SA896
⇒Q255, 256	8-765-300-00	Ⓒ 2SC2009
Q257	8-765-012-00	Ⓒ 2SC1811
Q258	8-761-622-00	Ⓑ 2SC1636
⇒Q301, 302	8-729-377-58	Ⓑ 2SC1775-E
⇒Q351, 352	8-729-377-58	Ⓑ 2SC1775-E
Q401	8-761-622-00	Ⓑ 2SC1636
Q451	8-761-622-00	Ⓑ 2SC1636
Q501	8-723-304-00	Ⓔ 2SK43-4
Q502	8-765-082-20	Ⓒ 2SA896
Q503	8-765-012-20	Ⓒ 2SC1811
Q504	8-765-300-00	Ⓒ 2SC2009
Q505	8-729-316-12	Ⓓ 2SC1061
Q506	8-729-194-56	Ⓑ 2SC945
Q507	8-729-989-93	Ⓒ 2SA899
Q508	8-729-194-56	Ⓑ 2SC945
Q509	8-727-312-00	Ⓒ 2SK42-2
Q511	8-723-304-00	Ⓔ 2SK43-4
Q552	8-765-082-20	Ⓒ 2SA896
Q553	8-765-012-20	Ⓒ 2SC1811
Q554	8-765-300-00	Ⓒ 2SC2009
Q555	8-729-317-12	Ⓔ 2SA671
Q556	8-729-989-93	Ⓒ 2SA899
Q557	8-729-194-56	Ⓑ 2SC945
Q558	8-729-989-93	Ⓒ 2SA899
Q559	8-727-312-00	Ⓒ 2SK42-2
Q601	8-729-665-47	Ⓑ 2SC1362
Q602	8-727-788-00	Ⓒ 2SA678
Q603	8-729-663-47	Ⓑ 2SC1364
Q604	8-727-788-00	Ⓒ 2SA678
Q651	8-729-665-47	Ⓑ 2SC1362
Q652	8-727-788-00	Ⓒ 2SA678
Q653	8-729-663-47	Ⓑ 2SC1364
Q654	8-727-788-00	Ⓒ 2SA678

⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

• Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	Part No.	Description
Q701	8-729-665-47	Ⓑ 2SC1362
⇒Q702	8-729-387-27	Ⓑ 2SA872-D
⇒Q703-705	8-729-663-47	Ⓑ 2SC1364
Q706, 707	8-722-384-01	Ⓒ 2SK23A-840 blue
Q708	8-761-510-06	Ⓕ 2SK58
Q709	8-727-788-00	Ⓒ 2SA678
⇒Q710-719	8-729-663-47	Ⓑ 2SC1364
Q751	8-729-665-47	Ⓑ 2SC1362
⇒Q752	8-729-387-27	Ⓑ 2SA872-D
⇒Q753-755	8-729-663-47	Ⓑ 2SC1364
Q756, 757	8-722-384-01	Ⓒ 2SK23A-840 blue
Q758	8-761-510-06	Ⓕ 2SK58
Q759	8-727-788-00	Ⓒ 2SA678
⇒Q760	8-729-663-47	Ⓑ 2SC1364
⇒Q801	8-760-413-10	Ⓒ 2SC1475
⇒Q802	8-762-020-00	Ⓔ 2SA835
⇒Q803	8-760-413-10	Ⓒ 2SC1475
Q804	8-720-950-03	Ⓓ 2SC926A
		IC
IC701	8-750-670-00	Ⓚ CX-067
		Diodes
D1	⚠ 8-719-510-10	Ⓒ SIRB10
⇒D101	8-719-815-55	Ⓑ 1S1555
⇒D151	8-719-815-55	Ⓑ 1S1555
⇒D201, 202	8-719-815-55	Ⓑ 1S1555
D301	8-719-912-00	Ⓑ MW-12N
⇒D501	8-719-831-07	Ⓑ EQB01-07
⇒D551	8-719-931-07	Ⓑ EQB01-07
D601	8-719-912-00	Ⓑ MV12N
D651	8-719-912-00	Ⓑ MV12N
⇒D701-704	8-719-815-55	Ⓑ 1S1555
⇒D754	8-719-815-55	Ⓑ 1S1555

⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

Ref. No.	Part No.	Description
D801	⚠ 8-719-510-10	Ⓒ SIRB10
⇒D802, 803	8-719-510-10	Ⓑ EQB01-24
D804	⚠ 8-719-510-10	Ⓒ SIRB10
⇒D805	8-719-930-12	Ⓑ EQB01-12Z
⇒D806, 807	8-719-200-02	Ⓑ 10E2
⇒D808	8-719-815-55	Ⓑ 1S1555
⇒D809	8-719-200-02	Ⓑ 10E2

CAPACITORS

All capacitors are in μF and ceramic unless otherwise noted.
50WV or less are not indicated except for electrolytics.
pF = μμF, elect = electrolytic

C1, 51	1-102-115-11	Ⓐ 560 p		
C2, 52	1-130-127-11	Ⓑ 0.015	100 V	polyethylene
C3, 53 C4, 54	1-131-429-11	Ⓖ 470	3.15 V	tantalum
C5, 55	1-102-119-11	Ⓐ 0.0015		
C7, 57	1-130-127-11	Ⓑ 0.015	100 V	polyethylene
C8–10 C58–60	1-131-295-11	Ⓒ 100	6.3 V	tantalum
C12, 13	1-131-202-11	Ⓑ 1.5	20 V	tantalum
C14, 15	1-108-239-12	Ⓐ 0.01		mylar
C16, 17	⚠ 1-123-066-11	Ⓑ 1000	25 V	elect
C18, 19	1-108-421-12	Ⓑ 0.01	200 V	mylar
C20–23	⚠ 1-121-943-11	Ⓑ 1000	10 V	elect
C101, 151	1-102-965-11	Ⓐ 39 p		
C102, 152	1-101-006-11	Ⓐ 0.047		
C103, 153 C104, 154	1-102-973-11	Ⓐ 100 p		
C105, 155	1-130-123-11	Ⓑ 0.0043	100 V	polyethylene
C106, 156	1-130-124-11	Ⓑ 0.015	100 V	polyethylene
C107, 157	1-131-217-11	Ⓑ 2.2	35 V	tantalum
C108, 158	1-102-963-11	Ⓐ 33 p		
C109, 159	1-130-122-11	Ⓑ 0.001	100 V	polyethylene
C112, 162	1-130-127-11	Ⓑ 0.015	100 V	polyethylene
C113, 163 C114, 164	1-121-396-11	Ⓐ 4.7	50 V	elect
C118, 168	1-102-947-11	Ⓐ 10 p		

Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description		
C202, 252	1-102-121-11	(A) 0.0022		
C203, 253 C204, 254	1-131-295-11	(C) 100	6.3 V	tantalum
C205, 255	1-130-127-11	(B) 0.015	100 V	polyethylene
C206–208 C256–258	1-101-006-11	(A) 0.047		
C209	1-121-391-11	(A) 1	50 V	elect
C210, 211	1-108-239-12	(A) 0.01		mylar
C212	1-121-396-11	(A) 4.7	50 V	elect
C213	1-102-973-11	(A) 100 p	50 V	
C301, 351	1-131-215-11	(B) 1	35 V	tantalum
C302, 352	1-121-393-11	(A) 3.3	50 V	elect
C401, 451	1-108-364-12	(B) 0.18		mylar
C402, 452	1-108-360-12	(A) 0.039		mylar
C403, 453	1-108-581-12	(B) 0.012		mylar
C404, 454 C405, 455	1-108-611-12	(B) 0.22		mylar
C501, 551	1-102-115-11	(A) 560		
C502, 552 C503, 553	1-108-228-12	(A) 0.0015		mylar
C504, 554 C505, 555	1-108-237-12	(A) 0.0068		mylar
C506, 556	1-108-360-12	(A) 0.039		mylar
C507, 557	1-108-364-12	(B) 0.18		mylar
C508, 558	1-102-125-11	(A) 0.0047		
C509, 559 C510, 560	1-131-239-11	(B) 6.8	35 V	tantalum
C511, 561	1-130-083-11	(C) 1	100 V	polyethylene
C514, 564	1-108-239-12	(A) 0.01		mylar
C516, 566	1-108-239-12	(A) 0.01		mylar
C517, 567	1-130-086-11	(B) 0.47	100 V	polyethylene
C518, 568	1-102-514-11	(A) 22 p		
C601, 651	1-121-393-11	(A) 3.3	50 V	elect
C602, 652	1-121-402-11	(A) 33	10 V	elect
C603, 653	1-102-864-11	(A) 5 p		
C604, 654	1-121-421-11	(B) 220	16 V	elect
C701, 751	1-121-391-11	(A) 1	50 V	elect
C702, 752 C703, 753	1-121-414-11	(A) 100	10 V	elect

Ref. No.	Part No.	Description		
C704, 754	1-121-651-11	(A) 10	16 V	elect
C705, 755	1-108-849-11	(B) 0.1		mylar
C706, 756	1-121-395-11	(A) 4.7	25 V	elect
C707, 757	1-121-414-11	(A) 100	10 V	elect
C708, 758	1-108-825-12	(A) 0.001		mylar
C709, 759	1-102-978-11	(A) 220 p		
C710, 760	1-131-448-11	(B) 1	35 V	tantalum
C720	1-121-651-11	(A) 10	16 V	elect
C721, 722	1-121-420-11	(B) 220	10 V	elect
C723	1-121-651-11	(A) 10	16 V	elect
C724	1-108-849-12	(B) 0.1		mylar
C725	1-108-845-12	(A) 0.47		mylar
C726	1-108-849-12	(B) 0.1		mylar
C727	1-121-450-11	(A) 2.2	50 V	elect
C728	1-121-651-11	(A) 10	16 V	elect
C729	1-121-414-11	(A) 100	10 V	elect
C730	1-121-975-11	(A) 47	10 V	elect
C731, 732	1-108-829-12	(A) 0.0022		mylar
C801–804	⚠ 1-102-355-11	(B) 0.01	500 V	
C805	⚠ 1-125-093-11	(J) 4700+4700	50 V	elect
C806, 807	1-121-396-11	(A) 4.7	50 V	
C808, 809	⚠ 1-123-063-11	(B) 220	35 V	elect
C810	⚠ 1-121-940-11	(B) 470	25 V	elect
C811	1-121-395-11	(A) 4.7	25 V	elect
C812	⚠ 1-123-193-11	(B) 100	16 V	elect
C813	⚠ 1-123-060-11	(B) 330	50 V	elect
C814	1-121-413-11	(A) 100	6.3 V	elect
C815, 816	1-123-250-11	(B) 2.2	100 V	elect
C817, 818	1-108-421-12	(B) 0.01		mylar
C901, 902	1-119-216-11	(B) 33	25 V	elect

RESISTORS

All resistors are in ohms and of ½W carbon unless otherwise noted. Common ¼W carbon resistors are omitted. Refer to the list on the last page for their part numbers.

R1, 51	1-244-872-11	(A) 910
R2, 52	1-244-851-11	(A) 120
R3, 53	1-244-855-11	(A) 180
R4, 54	1-244-849-11	(A) 100

Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description			
R5, 55 R6, 56	1-244-864-11	(A) 430			
R7, 57	1-244-801-11	(A) 1			
R9, 59	1-244-833-11	(A) 22			
R10, 60	1-244-891-11	(A) 5.6 k			
R11, 61 R12, 62	1-244-872-11	(A) 910			
R13, 63	1-244-909-11	(A) 33 k			
R14, 64	1-244-905-11	(A) 22 k			
R15, 65	1-244-897-11	(A) 10 k			
R16, 66	1-244-833-11	(A) 22			
R17	1-244-915-11	(A) 56 k			
R18, 19	1-244-867-11	(A) 560			
R20	1-244-890-11	(A) 5.1 k			
R21	1-244-891-11	(A) 5.6 k			
R22	1-244-861-11	(A) 330			
R23, 24	1-244-857-11	(A) 220			
R25, 26	1-244-849-11	(A) 100			
R101, 151	1-244-923-11	(A) 120 k			
R102, 152	1-244-849-11	(A) 100			
R103, 153	1-244-864-11	(A) 430			
R104, 154	1-244-909-11	(A) 33 k			
R105, 155	1-244-865-11	(A) 470			
R107, 157	1-244-862-11	(A) 360			
R108, 158	1-214-162-11	(B) 18 k	¼W		metal oxide
R109, 159	1-214-472-11	(B) 210 k	½W		metal oxide
R116, 166	1-244-945-11	(A) 1			
R117, 167	1-244-909-11	(A) 33 k			
R118, 168	1-244-866-11	(A) 510			
R120, 170	1-244-881-11	(A) 2.2 k			
R201, 251	1-244-897-11	(A) 10 k			
R202, 252	1-244-919-11	(A) 82 k			
R203, 253	1-244-945-11	(A) 1			
R204, 254	1-244-873-11	(A) 1 k			
R205, 255	1-244-905-11	(A) 22 k			
R208, 258	1-244-873-11	(A) 1 k			
R209, 259	1-244-897-11	(A) 10 k			
R214, 264	1-244-873-11	(A) 1 k			

- Circled letters ((A) to (Z)) are applicable to European models only.

Ref. No.	Part No.	Description			
R219, 269	1-244-905-11	(A) 22 k			
R509, 559	1-244-873-11	(A) 1 k			
R510, 560	1-244-945-11	(A) 1			
R511, 561	1-244-893-11	(A) 6.8 k			
R512, 562	1-244-881-11	(A) 2.2 k			
R513, 563	1-244-897-11	(A) 10 k			
R514, 564	1-244-861-11	(A) 330			
R520, 570	1-244-911-11	(A) 39 k			
R521, 571	1-244-870-11	(A) 750			
R524	⚠ 1-212-979-11	(A) 75	½W		fusible
R531, 581	1-244-905-11	(A) 22 k			
R574	⚠ 1-212-977-11	(A) 62	½W		fusible
R608, 658 R611, 661	⚠ 1-212-895-11	(A) 390	¼W		fusible
R801, 802	⚠ 1-211-505-11	(A) 20	¼W		nonflammable
R805, 806	⚠ 1-212-883-11	(A) 120	¼W		fusible
R901, 951	1-244-919-11	(A) 82 k			
R1001, 1051	1-244-940-11	(A) 620 k			
R1002, 1052	1-244-837-11	(A) 33			
R1003, 1053	1-244-921-11	(A) 100 k			
RT701, 751	1-222-804-00	(B) 1 k, adjustable			
RT702, 752	1-222-701-00	(B) 10 k, adjustable			
RT703, 753	1-222-978-00	(B) 4.7 k, adjustable			
RV201, 251	1-224-987-00	(H) 100 k, variable; ATTENUATOR			
RV401, 451	1-224-986-00	(E) 100 k, variable; BALANCE			
RV402, 452	1-224-988-00	(H) 50 k, variable; TREBLE			
RV403, 453	1-224-989-00	(H) 51 k, variable; BASS			
RV404	1-552-119-00	(K) 250 k, variable; METER SENS/ MODE including S13			
RV601, 651	1-224-723-00	(C) 250 k, variable; HEADPHONES LEVEL			

Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

• Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	*Part No.*	*Description*
		SWITCHES
S1	1-552-089-00	Ⓔ Lever Slide, FUNCTION (1)
S2	1-552-120-00	Ⓗ Rotary, FUNCTION (2)
S3, 4	1-552-032-00	Ⓓ Lever Slide, TAPE COPY, MONITOR
S5	1-552-118-00	Ⓗ Rotary, MODE
S6	1-552-031-00	Ⓒ Lever Slide, MUTING
S7–9	1-552-090-00	Ⓗ Lever Slide, TONE TURNOVER TREBLE, BASS
S10, 11	1-552-085-00	Ⓓ Lever Slide, HIGH FILTER, LOW FILTER
S13	1-552-119-00	Ⓚ Rotary, METER SENS/MODE; including in RV404
S14	⚠1-552-141-12	Ⓔ Pushbutton, POWER (AEP, UK model)
S14	⚠1-552-246-00	Pushbutton, POWER (US Canadian model)
S15, 65	1-552-165-00	Ⓗ Rotary, PHONO 2
		JACKS
J101, 151 J102, 152	1-507-416-XX	Ⓒ 4 p, PHONO 1, 2
J103–105 J153–155	1-507-430-XX	Ⓓ 6 p, TUNER, AUX-1, 2
J106–111 J156–161	1-507-470-00	Ⓒ 4 p, TAPE-1, 2, REC OUT-1, 2, OUTPUT-1, 2
J501	1-507-453-00	Ⓒ TAPE 2
J502	1-507-454-00	Ⓒ REC OUT 2
J601	1-507-453-00	Ⓒ HEADPHONE
CNJ1	⚠1-509-546-00	Ⓓ Socket, 3 p (AEP, UK model)
CNJ 1-3	⚠1-526-574-00	Socket, 3 p (US, Canadian model)
CNP1	⚠1-534-992-XX	Cord, power (US, Canadian model)
CP1	⚠1-231-326-11	Encapsulated Component, C-R (US, Canadian model)

MISCELLANEOUS

F1	⚠1-532-078-00	Ⓑ Fuse, 1 A (AEP, UK model)
L401, 451	1-407-879-00	Ⓑ Microinductor, 33 mH
ME1, 2	1-520-298-00	Ⓛ Meter, level; including 1-518-273-00 Lamp (PL 1, 2)
RY1, 2	1-515-277-00	Ⓕ Relay
RY3	1-515-267-00	Ⓕ Reed Relay
T1	⚠1-442-975-00	Ⓢ Transformer, power (UK, AEP model)
	⚠1-442-969-11	Transformer, power (US, Canadian model)
VSI	⚠1-508-897-00	Ⓒ Voltage selector (AEP, UK model)
	⚠1-533-131-00	Ⓐ Holder, fuse (AEP, UK model)

ACCESSORIES & PACKING MATERIALS

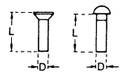
Part No.	*Description*
1-506-113-00	Ⓑ Short Plug
1-534-819-12	Ⓖ Cord, power (UK model)
1-551-085-00	Ⓕ Phono Cord
3-701-622-00	Ⓐ Bag, plastic; power cord (UK model)
3-701-630-00	Ⓐ Bag, plastic; printed matters
3-770-043-21	Manual, instruction (US, Canadian model)
3-770-432-11	Ⓘ Manual, instruction (AEP, UK model)
3-794-246-31	Leaflet, french (Canadian model)
4-837-003-00	Ⓒ Bag, protection
4-838-952-00	Ⓒ Cushion
4-848-833-01	Ⓗ Carton (AEP, UK model)
4-848-834-00	Carton (US, Canadian model)

Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

HARDWARE NOMENCLATURE

Screw: P 3 x 10
- *L: Length in mm*
- *D: Diameter in mm*
- *Type of head*
- *Indicated slotted-head only. Unless otherwise indicated, it means cross-recessed head (Phillips type).*



Nut, Washer, Retaining ring: N 3
- *Diameter of usable screw or shaft*
- *Reference designation*

Reference Designation	Shape	Description	Remarks
		SCREWS	
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		braizer-head screw	

Reference Designation	Shape	Description	Remarks
		SELF-TAPPING SCREWS	
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
		SET SCREWS	
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
		NUT	
N		nut	
		WASHERS	
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
		RETAINING RINGS	
E		retaining ring	
G		grip-type retaining ring	

Ⓐ : appricable to European models only

1/4 WATT CARBON RESISTORS

Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*
1.0	1-244-601-11	10	1-244-625-11	100	1-244-649-11	1.0k	1-244-673-11	10k	1-244-697-11	100k	1-244-721-11	1.0M	1-244-745-11
1.1	1-244-602-11	11	1-244-626-11	110	1-244-650-11	1.1k	1-244-674-11	11k	1-244-698-11	110k	1-244-722-11	1.1M	1-244-746-11
1.2	1-244-603-11	12	1-244-627-11	120	1-244-651-11	1.2k	1-244-675-11	12k	1-244-699-11	120k	1-244-723-11	1.2M	1-244-747-11
1.3	1-244-604-11	13	1-244-628-11	130	1-244-652-11	1.3k	1-244-676-11	13k	1-244-700-11	130k	1-244-724-11	1.3M	1-244-748-11
1.5	1-244-605-11	15	1-244-629-11	150	1-244-653-11	1.5k	1-244-677-11	15k	1-244-701-11	150k	1-244-725-11	1.5M	1-244-749-11
1.6	1-244-606-11	16	1-244-630-11	160	1-244-654-11	1.6k	1-244-678-11	16k	1-244-702-11	160k	1-244-726-11	1.6M	1-244-750-11
1.8	1-244-607-11	18	1-244-631-11	180	1-244-655-11	1.8k	1-244-679-11	18k	1-244-703-11	180k	1-244-737-11	1.8M	1-244-751-11
2.0	1-244-608-11	20	1-244-632-11	200	1-244-656-11	2.0k	1-244-680-11	20k	1-244-704-11	200k	1-244-728-11	2.0M	1-244-752-11
2.2	1-244-609-11	22	1-244-633-11	220	1-244-657-11	2.2k	1-244-681-11	22k	1-244-705-11	220k	1-244-729-11	2.2M	1-244-753-11
2.4	1-244-610-11	24	1-244-634-11	240	1-244-658-11	2.4k	1-244-682-11	24k	1-244-706-11	240k	1-244-730-11	2.4M	1-244-754-11
2.7	1-244-611-11	27	1-244-635-11	270	1-244-659-11	2.7k	1-244-683-11	27k	1-244-707-11	270k	1-244-731-11	2.7M	1-244-755-11
3.0	1-244-612-11	30	1-244-636-11	300	1-244-660-11	3.0k	1-244-684-11	30k	1-244-708-11	300k	1-244-732-11	3.0M	1-244-756-11
3.3	1-244-613-11	33	1-244-637-11	330	1-244-661-11	3.3k	1-244-685-11	33k	1-244-709-11	330k	1-244-733-11	3.3M	1-244-757-11
3.6	1-244-614-11	36	1-244-638-11	360	1-244-662-11	3.6k	1-244-686-11	36k	1-244-710-11	360k	1-244-734-11	3.6M	1-244-758-11
3.9	1-244-615-11	39	1-244-639-11	390	1-244-663-11	3.9k	1-244-687-11	39k	1-244-711-11	390k	1-244-735-11	3.9M	1-244-759-11
4.3	1-244-616-11	43	1-244-640-11	430	1-244-664-11	4.3k	1-244-688-11	43k	1-244-712-11	430k	1-244-736-11	4.3M	1-244-760-11
4.7	1-244-617-11	47	1-244-641-11	470	1-244-665-11	4.7k	1-244-689-11	47k	1-244-713-11	470k	1-244-737-11	4.7M	1-244-761-11
5.1	1-244-618-11	51	1-244-642-11	510	1-244-666-11	5.1k	1-244-690-11	51k	1-244-714-11	510k	1-244-738-11	5.1M	1-244-762-11
5.6	1-244-619-11	56	1-244-643-11	560	1-244-667-11	5.6k	1-244-691-11	56k	1-244-715-11	560k	1-244-739-11		
6.2	1-244-620-11	62	1-244-644-11	620	1-244-668-11	6.2k	1-244-692-11	62k	1-244-716-11	620k	1-244-740-11		
6.8	1-244-621-11	68	1-244-645-11	680	1-244-669-11	6.8k	1-244-693-11	68k	1-244-717-11	680k	1-244-741-11		
7.5	1-244-622-11	75	1-244-646-11	750	1-244-670-11	7.5k	1-244-694-11	75k	1-244-718-11	750k	1-244-742-11		
8.2	1-244-623-11	82	1-244-647-11	820	1-244-671-11	8.2k	1-244-695-11	82k	1-244-719-11	820k	1-244-743-11		
9.1	1-244-624-11	91	1-244-648-11	910	1-244-672-11	9.1k	1-244-696-11	91k	1-244-720-11	910k	1-244-744-11		

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